A3260-1-F

VOLUNTARY STERILIZATION: AN INTERNATIONAL FACT BOOK

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Association for Voluntary Sterilization

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Publication of this work was made possible by a grant from the Rockefeller Foundation.

Data from the following sources are used by permission of the authors or publishers:

Mauldin, W. P., and Lapham, R. J. 1984. Conditions of fertility decline in LDCs: 1965–1980. Paper read at meeting of the Population Association of America, May 3–5, Minneapolis.

Nortman, D. 1969–1976, 1978, 1980, 1982. *Population and family planning programs: A fact book.* New York: Population Council.

Westinghouse Health Systems. 1984. Special tabulation, February 29. Columbia, Md.

Typesetting: Hyer Graphics
Printing: Faculty Press

ISBN 0-9604536-0-1

Manufactured in the United States of America

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FOREWORD

The data assembled in this fact book tell a remarkable story: that voluntary sterilization protects more women against pregnancy than any other method of contraception. This is true for the world as a whole, and for the United States and a number of developing countries as well.

But the numbers in this book, assembled in their orderly ranks and files, show much more. They show that people in every region of the world, in a wide variety of economic, political, religious, and social settings, turn to voluntary sterilization when they decide that they want no more children. They show that within the contraceptive revolution of the 1970s there was another, unheralded sterilization revolution, one that is still under way. They show also how technical advances in sterilization techniques like laparoscopy and minilaparotomy have improved the ease, safety and effectiveness of sterilization, thus making it a practical choice for couples who want to end their fertility, and a service that nongovernment and government programs can realistically offer.

These data also show that there are still large numbers of men and women in every region of the world who do not yet have effective access to voluntary sterilization services, primarily because restrictive policies and laws prevent services from being offered. Wherever services are offered, people take them up.

An interesting perspective on this may be gained by considering the case of the United States. In 1960, sterilization was not easy to get in the U.S. A host of restrictive attitudes, policies, regulations, and laws intruded at every level; 6% of couples were protected by sterilization: in two-thirds of the couples the women were sterilized, and in one-third the men were. Then policies and official attitudes began to change. By 1970 prevalence had climbed to 10.6%, and by 1982 it was 27.9%.

Similar advances have been made in other countries that are by no means similar to the United States. This suggests, it seems to me, that the need and the demand are there, and require only three things to become apparent: nonrestrictive policies, availability of services, and time.

In the face of this rising demand, we must be especially careful to maintain quality. We must make certain that potential clients understand what sterilization is—its consequences and risks—and also that they know what the alternatives are, so that they can decide what is best for them. We must maintain high standards of safety and effectiveness and pay attention to clients' needs before, during and after surgery.

We hope that this fact book, in showing how many people rely on voluntary sterilization and in suggesting the need that remains, will encourage governments and nongovernment organizations to include or extend quality voluntary sterilization services in their health programs. Besides responding to what appears to be a fundamental need, these services can contribute substantially to the health and well-being of women, children and families, and to the economic health and welfare of countries. If this fact book contributes to those ends, it will have served its purpose well.

Hugo Hoogenboom
Executive Director
Association for Voluntary Sterilization

ACKNOWLEDGMENTS

We owe much, on many counts, to others for their contributions to the birth of this monograph. The concept of a systematic assessment of global sterilization activity came in 1982 from Terrence Jezowski, Director of AVS's International Programs Division, and he and his staff have given steady support to its development. For overall counsel or for assistance in obtaining important data, we thank especially W. Parker Mauldin of the Rockefeller Foundation, Mary Beth Weinberger of the United Nations Population Division, Gary Lewis and Jeanne Cushing of Westinghouse Health Systems, Robert J. Lapham of the National Academy of Sciences, William F. Pratt of the National Center for Health Statistics, Leo Morris and Joyce M. Hughes of the Centers for Disease Control, M. E. Khan of the Operations Research Group, New Delhi, and the State Family Planning Commission, People's Republic of China. For their assistance with the legal section of the manuscript, we are indebted to Stephen Isaacs and Rebecca Cook of the Center for Population and Family Health, Columbia University, Jean-Marie Pelet of the United Nations Population Division, and John Paxman of the Pathfinder Fund. Dr. Nicholas Wright, Dr. Herbert Peterson, and Dr. Siew-Ean Khoo reviewed the early manuscript and provided helpful comments.

At the Association for Voluntary Sterilization, Betty Gonzales, Assistant Director of the Medical Division, provided extensive assistance in the development and editing of the medical chapters. P. E. Balakrishnan and Gary Newton gave substantive help on particular countries, especially Bangladesh and India. The three regional offices of AVS, in Dhaka, Bogotá, and Tunis, furnished important data. Tessa Wardlaw in the New York office provided research assistance of a very high order. We also thank William Record, librarian at AVS, for his untiring assistance with our innumerable requests. Thanks are also due to staff members of AVS and the World Federation for Voluntary Surgical Contraception, who read the early draft with great care. For word processing the many drafts of the text and tables, thanks are due to Barbara Lockett, Ruth Burns, Lorna Noel, Ida LoGuidice, Barbara Morrison, Nannette Doom, and Rebecca Winson. Meliha Pile proofread the book.

This work was first presented at the Fifth International Conference on Voluntary Surgical Contraception, which was supported by the Agency for International Development and organized by the World Federation. Publication of this report was funded by a grant from the Rockefeller Foundation.

We save this final paragraph to recognize the work of copy editing by Dore Hollander and the production management of the manuscript by Pamela Harper, both at the highest level of professional excellence.

John A. Ross
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ABBREVIATIONS AND ACRONYMS USED IN TEXT AND TABLES

ADS: Asociación Demográfica Salvadoreña
AID: United States Agency for International Development
APROFAM: Asociación Pro-Bienestar de la Familia de Guatemala
ASFR: age-specific fertility rate
AVS: Association for Voluntary Sterilization
BCT: Birth Control Trust
BEMFAM: Sociedade Civil de Bem-Estar Familiar do Brasil
CDC: United States Centers for Disease Control
CELADE and CFSC: Centro Latinoamericano de Demografía and Community and Family Study Center
CONAPOFA: Consejo Nacional de Población y Familia
CPAIMC: Centro de Pesquisas de Assistencia Integrada a Mulher e a Criança
CPS: contraceptive prevalence survey
CSFPC: China, People's Republic of, State Family Planning Commission
FHI: Family Health International
ICMR: Indian Council of Medical Research
IPPF: International Planned Parenthood Federation
IUD: intrauterine device
KIFP: Korean Institute for Family Planning
MASFR: marital-age–specific fertility rate
MCA: methylcyanoacrylate
MTP: medical termination of pregnancy
MWRA: married women of reproductive age
NSFG: United States National Survey of Family Growth
ORG: Operations Research Group
PID: pelvic inflammatory disease
PKMI: Indonesian Association for Secure Contraception
POPLAB: International Program of Laboratories for Population Statistics
PPRC and JOICFP: Population Problems Research Council and Japanese Organizations for International Cooperation in Family Planning
PROFAMILIA: Asociación Pro-Bienestar de la Familia Colombiana
SCYP: standard couple years of protection
SLAVSC: Sri Lanka Association for Voluntary Surgical Contraception
TAVS: Thai Association for Voluntary Sterilization
TMFR: total marital fertility rate
UNDIESA: United Nations, Population Division, Department of International Economic and Social Affairs
UNFPA: United Nations Fund for Population Activities
WFS: World Fertility Survey
WHO: World Health Organization
WHS: Westinghouse Health Systems

TABLE NOTES

Because of their length and complexity, Tables A–I from Chapter 2 appear on pages 53–110.

The first digit of each numbered table (e.g., Table 2.1, Table 4.1) refers to the chapter number. All numbered tables appear in their corresponding chapters.

Because of rounding, the sum of individual items in a table may not always equal the total that is given.

Prevalence figures may differ from table to table because of differences in age range or base population, or because of minor discrepancies between sources.

In some tables numbers are not always carried out to the same number of decimal places. In the interest of accuracy, the authors included figures after the decimal point only if the original source provided such information.

Dashes and empty cells mean information was not available or could not be calculated, sometimes because there were too few cases for sampling reliability.

In this book Puerto Rico is treated as a country. Data for the United States include information from only the 50 states.

1. INTRODUCTION

No source book on sterilization has ever been published, although voluntary sterilization is used more widely than any other contraceptive method. Sterilization has been included in the coverage of innumerable survey questionnaires since the 1950s, and has been followed in the statistical systems of many family planning programs. Clinical records and follow-up interviews have provided data on complications and other sequelae, and an extensive social science literature has accumulated. The relevant laws and policies have been compiled, and the demographic effectiveness of the method studied. It is the purpose of this volume to present and interpret these data.

Although this document focuses upon sterilization only, it is important to view voluntary sterilization in the context of other family planning methods. Except in China, the world's two most prevalent methods of contraception are sterilization and the pill, with no other method approaching them in overall numbers protected. They contrast greatly in their essential characteristics, and perhaps because of that, they serve together a broad variety of situations. Sterilization has the key advantage of offering permanent protection in a single step, with essentially complete assurance against failure. The oral contraceptive offers exactly those features that sterilization lacks: It is easy to initiate, easy to reverse, and relatively easy to distribute in rural areas, where surgical facilities are not available. Thus, it attracts higher proportions of couples who are spacing or who require a method that places few barriers in the way of starting contraceptive practice—i.e., younger, lower parity couples. For a large national program, the pill offers the advantage of high acceptability; but it generally is associated with brief continuation, and in actual use, it often fails to prevent unwanted pregnancy. Sterilization has the opposite qualities: lower acceptance rates, but long continuation and high effectiveness. To repeat, these two methods cover the needs of many couples.

The IUD is perhaps the next most popular method after these two, and in China it clearly exceeds them, accounting for half of all contraceptive use. It is intermediate on almost all the qualities mentioned: acceptance rates, continuation, and effectiveness in practice. It is suitable for use in both rural and urban areas, and can serve both spacing and stopping purposes. The condom, injectable, and other methods are used less, but are popular in selected locations; each has its particular advantages and its own group of satisfied users.

This volume concentrates upon the sterilization method. It presents first the large body of information on incidence and prevalence, with stress upon time trends by country, as well as upon demographic differentials. Following this discussion is a review of the kinds of laws and regulations that govern the provision and use of voluntary sterilization, and then a description of programmatic actions taken by governments and other agencies. A summary of findings from the social science literature follows. Subsequent sections present medical aspects, including a description of the various surgical techniques used to perform sterilization (and its reversal) and their safety and effectiveness. Finally, the demographic effects of sterilization are examined.

2. INCIDENCE AND PREVALENCE

INTRODUCTION

We have compiled in Tables A–I (pages 53-110) a set of data on sterilization, from both surveys and service statistics, for all countries on which information could be found. The available historical series was sought in each case, and finding such data was made easier by the recency of sterilization activity, since in most countries the series began no more than 10–15 years ago. The overall character of the compilation is intended to be similar to that of Christopher Tietze's *Induced Abortion: A World Review* and Dorothy Nortman's more general source book *Population and Family Planning Programs*. We have drawn heavily upon the latter for data, and also upon the World Fertility Survey (WFS) series, the Westinghouse Health Systems series, and the U.S. Centers for Disease Control (CDC) series for Latin America, in addition to the older CELADE (Latin American) series and a variety of individual country sources, as cited in the table notes. The emphasis is demographic and epidemiologic, with attention to large public programs and to the private sector.

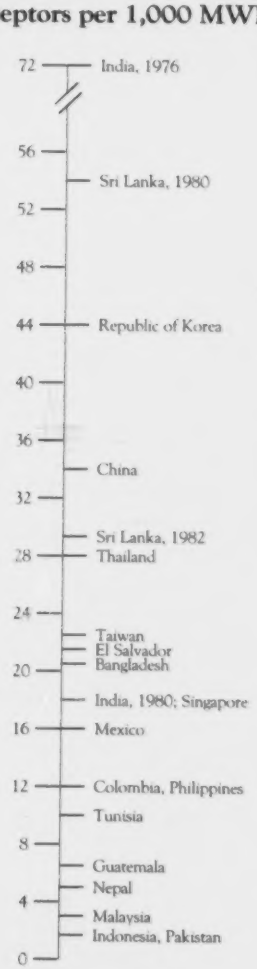
INCIDENCE: Annual Numbers of Acceptors and Acceptance Rates of Sterilization

It is logical to give first the picture of sterilization incidence, i.e., the numbers of procedures done annually (Table A and Figure 2.1), before going on to prevalence, i.e., the proportions of couples currently protected by sterilization. There are two links between incidence and prevalence. The first is the unbroken continuation of sterilization, which assures the highest prevalence for any incidence. That is, a maximum accumulation of protected couples results from whatever numbers of sterilizations are performed over the years. The second link is the cutoff at the end of the childbearing years, set here at age 44 (in some cases, 49). This limit affects the prevalence figures to the extent that all married women eventually age out of the denominator and wives among sterilized couples pass out of the numerator. Overall prevalence either rises or declines, depending upon which group is more heavily involved.

For most countries, the incidence figures given in Table A are incomplete, since it is very difficult to capture activity in both the public and the private sectors. For most developing countries, the figures represent sterilizations performed in the large public program, which is usually administered or supported by the government; but for most developed countries, the figures represent numbers performed privately. Table notes give details.

The dominant pattern is that sterilization incidence is high or rising in many countries and is declining almost nowhere. It is, however, low in some countries, especially in Africa, but also in Latin America and Asia, even though Asia as a whole has high incidence. Countries for which no data are available and those in which incidence is trivial are omitted from the table; generally, these two types are the same. An exception of importance may be the USSR, for which no figures are known to be available. According to one source, in the USSR, "there are strict legal prohibitions against vasectomy and female sterilization, which is usually available only for high-risk pregnant women afflicted with major debilitating diseases or other serious illnesses" (David and McIntyre, 1981, p. 109).

Figure 2.1. Sterilization acceptance rates, based on married women of reproductive age (MWRA): Selected countries and years[1]



Note

1. 1979, 1980, or 1981 for all countries except as noted. Two time points are given for Sri Lanka and India.

Tables A–I are on pages 53-110

In the eight countries that contain two-thirds of the population of the developing world, incidence varies. The two giants, China and India, which account for 49% of the developing world's population, both have high incidence, roughly 2–3% per year of all couples (see Figure 2.1). The fifth-largest developing country, Bangladesh, has about 2%, and Mexico (eighth-largest), about 1.6%. Neither Indonesia (third) nor Pakistan (sixth) has appreciable incidence, although pockets of sterilization activity exist in certain Indonesian cities. Incidence in Nigeria (seventh) is near zero (not shown). Brazil (fourth) has substantial prevalence, but incidence is unknown (not shown).

A second pattern that characterizes several countries is that of substantial fluctuations, as seen in Table A and in the Figure 2.1 rates for India and Sri Lanka. Foremost is the case of India, where the massive 1976 Emergency Campaign recruited over 7% of all couples in one year, including more than 10% in certain states. The numbers dropped drastically in 1977 and then returned gradually to roughly their earlier levels (more for females, less for males). Sri Lanka has also seen large fluctuations in recent years, which parallel a series of increases and decreases in the payments made to acceptors; the fluctuations in male sterilizations have followed the payment changes more closely than have those in female ones. The Bangladesh government instituted a special campaign in 1977 that temporarily raised the number of vasectomies to twice the number performed in the years before and after. The Chinese figures are incomplete and of uncertain reliability, but they suggest considerable annual variations as well.

There are, of course, other reasons than program changes for fluctuations. The number of new couples arriving at the relevant ages and parities changes year by year, growing sometimes quickly and sometimes more slowly. These demographic factors are, however, generally considered to be minor relative to the potential effects of program vigor or policy changes. China may be a partial exception, as it appears that the number of Chinese women reaching the marriage age is quite uneven. Of course, program and policy factors are also powerful there.

Annual incidence may also slacken when the eligible population becomes saturated by previous sterilization. This probably does not occur until the overall prevalence level for all methods combined is quite high, or perhaps not until the prevalence of sterilization itself has risen to a high level (Ross and Potter, 1980). Nevertheless, it is possible that in the few countries where very high proportions of couples of childbearing age are already sterilized, the annual numbers of new sterilizations will be depressed simply because the residual group of nonusers is small. Two offsetting factors are the increasing interest in sterilization among younger couples and the ever larger number of younger couples moving up the age pyramid.

Saturation considerations may apply to the Asian countries mentioned, but also, and perhaps more so, to certain Latin American countries. We do not have recent incidence figures for Panama or Puerto Rico, but other data (Table B) show sterilization to be extremely popular in both places. Costa Rica and El Salvador also deserve mention in this respect, and Costa Rica is another case where incidence fluctuated sharply, but temporarily, in response to government policy (Gómez Barrantes et al., 1983).

In Africa, the sole country with substantial sterilization activity is Tunisia, which has included sterilization in its official program. No other national program there is active in sterilization. However, little is known about private-sector activities in major African cities.

Sterilization acceptors are overwhelmingly females, but there are significant breaks in the pattern. India and Bangladesh are, of course, well known for their substantial vasectomy programs. Since 1962, the Republic of Korea has included vasectomy in its national program, and not until 1977 did the number of female sterilizations exceed that of male procedures there (Table A). Vasectomy appears to account for a significant share of all sterilizations in Sichuan Province of China, but holds unclear shares in other Chinese provinces. It is important in Sri Lanka, and occurs in appreciable numbers in Taiwan and Thailand as well. (In the developed world, Great Britain and the United States are the countries with greatest vasectomy activity.)

Pilot projects and temporary campaigns in a variety of countries have established the existence of a market for vasectomy (Atkins and Jezowski, 1983). However, overall numbers have been depressed in most areas because of what is termed "provider determinants," i.e., the reluctance of national programs to establish widespread male services and to publicize them adequately.

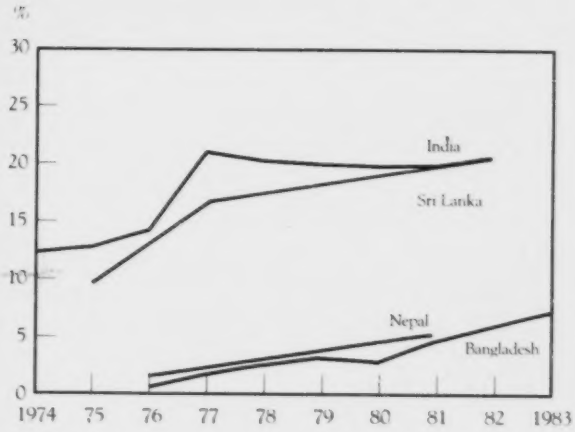
A further depressant of vasectomies has apparently been the genuine popularity of the simplified surgical methods for female sterilization. In many areas, the upward trend in female procedures has been quite sharp since the introduction of the laparoscope and the minilap method in the early 1970s. Table A indicates that in most countries for which data are available on both male and female procedures, increases have been much greater for the latter. Furthermore, where male procedures have declined, the female increase has often more than compensated, indicating a net gain from the simplified methods.

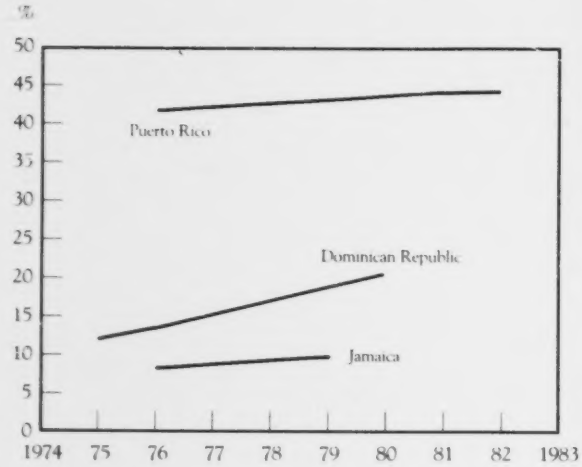
PREVALENCE AND NUMBERS OF USERS

Information on the prevalence of sterilization comes predominantly from surveys (Table B and Figure 2.2). In a few cases, as for India in most years, it derives from service statistics, so that only the public sector, not the private, is represented. (However, the 1970 and 1980 entries for Indian survey data cover both sectors.) The principal sources of information for the developing world are the WFS, the two series associated with Westinghouse Health Systems and the U.S. Centers for Disease Control, the CELADE series from the 1960s, and other surveys done on an individual basis. In virtually all cases, surveys for the same country were done independently from one another, rather than as repeat interviews of the same respondents.

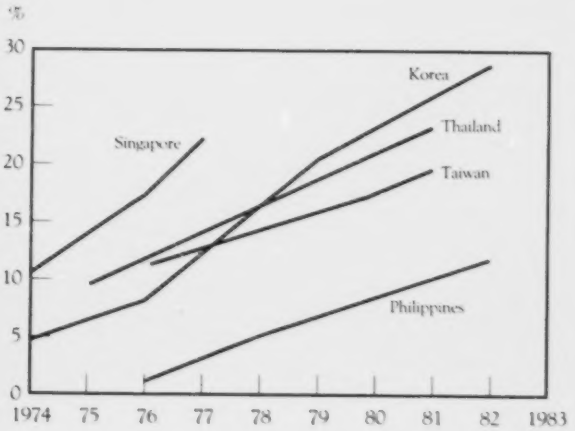
As noted in the discussion of Table A, there is a link between incidence and prevalence, in that the nearly perfect continuation for sterilization raises prevalence to its maximum for any past schedule of annual incidence. This effect is greater in cases where a country's program has been operating longer or where the women involved have been younger at

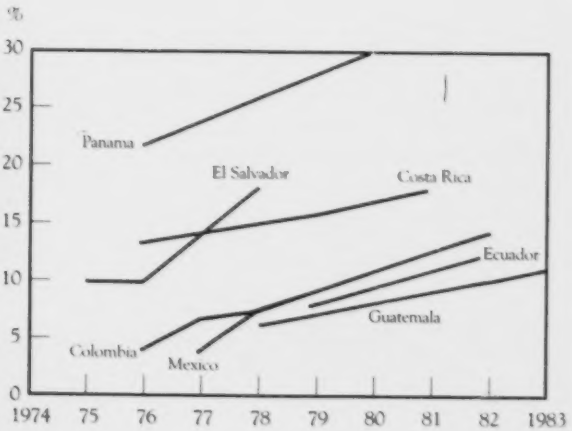
Figure 2.2. Percentage using sterilization among married women of reproductive age: Selected countries





Note: Vertical scale is more compressed than on other charts in this figure.





References: See Table B.

the time of the operation, since both of these features allow a greater buildup of users over time. Methods with short continuation lack this buildup; for them, prevalence can reflect only recent acceptances.

The most notable feature shown in Table B is that sterilization prevalence is already very high in a substantial number of countries in Asia and Latin America, and in the West. Puerto Rico and the United States stand highest: Puerto Rico at 46% and the United States at 39% (including hysterectomies; 28% without them). Panama is next at 30% Certain Indian states were higher in the 1982 national survey: Kerala was a remarkable 49%; Gujarat, 35%; Maharashtra, 33%; and Andhra Pradesh, 32%.

Next come the Republic of Korea at 28%, China at 25%, Thailand at 23%, Singapore at 22%, India and Sri Lanka at 21%, and then Taiwan, Hong Kong, Costa Rica, the Dominican Republic, and El Salvador, all between 18% and 21%. In Europe, the Netherlands stands at 20% and England and Wales at 16%. Thus, the levels of sterilization prevalence are very high in many countries, including some of the largest ones, with one-fifth to almost one-half of all couples using the sterilization method.

As to trends, Figure 2.2 shows the pace of change over the last decade in 19 countries, arranged by region. The figure comes from Table B, using entries where prevalence is given for at least two dates since 1974. The picture is clearly one of a rapid, historic, and unprecedented movement toward permanent contraception, in a diversity of settings.

Of the largest countries not already mentioned, Indonesia, Pakistan, and Nigeria have very low sterilization prevalence. In Bangladesh, prevalence has been rising, with 7% in 1983. Local surveys in Brazil suggest high national prevalence there; and a 1982 survey in Mexico showed 14% prevalence.

We must return, however, to China and India. They far overshadow the rest of the developing world for the double reason of the size of their populations and their stress on the sterilization method. As to population, they make up half (49%) of the developing world, as already noted. As to sterilizations, China and India have vastly greater annual numbers than the rest of Asia combined. As regards current users, in China, as of the 1982 national survey, there were about 42 million couples protected by sterilization (of wife or husband). In India, the government estimates that 20% of couples are protected by sterilization, and the 1980 national survey gives 20–22%. On India's population of about 114 million married women aged 15–44, this yields at least 23 million sterilization users, very close to the 24.5 million given in Table B. Thus, China and India together have at least 65 million couples protected from pregnancy by sterilization, dominating the global picture. Moreover, recent reports indicate that the Chinese government may now be insisting on sterilization after the second child ("China steps up . . .," 1983, p. 3).

Regardless of events in China and India, it is significant that a considerable number of other countries, quite independently and in diverse settings, have experienced high incidence and growing prevalence. In some cases strong public programs have been involved, and in others they have not, just as with the oral contraceptive and other leading methods.

It is equally true that in numerous countries, sterilization prevalence is quite low. In some of these, prevalence for all contraceptive methods is also low, but in others it is not. Indonesia and Thailand offer a striking contrast in this respect: Both have attained overall prevalence above 50%, but sterilization prevalence is almost negligible in Indonesia, while it exceeds 20% in Thailand.

PREVALENCE OF NONCONTRACEPTIVE STERILIZATION AND OF INFECUNDITY

It is of interest to place contraceptive sterilization into the larger context of all sterility, including other surgical sterilization and natural infecundity. Table C, drawn principally from a compilation of WFS data, provides this information.

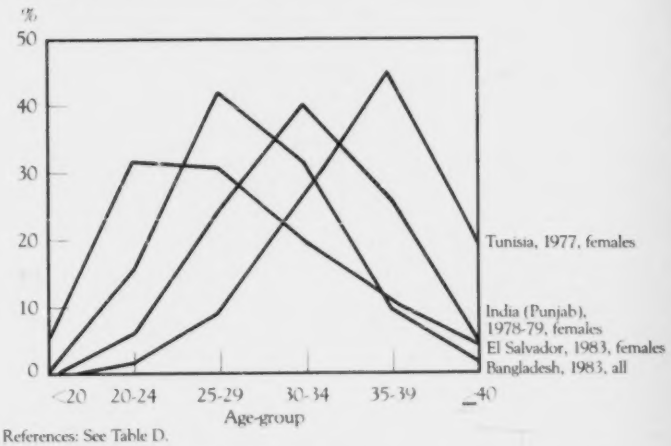
In developing countries, prevalence of noncontraceptive sterilization is negligible. It is always below 2% of couples except in Costa Rica, the Dominican Republic, and Panama, and even in these countries, we may suspect some tendency to report contraceptive operations as noncontraceptive in intent. In the United States, however, the proportion rose to 11% by 1982, reflecting a large number of hysterectomies. Although some surveys contain improbable figures on infecundity, it is quite clear that in many developing countries, 5–15% of married women consider themselves infecund.

AGE PATTERNS OF ACCEPTORS

In Bangladesh, over 65% of acceptors in 1978–1979 were not yet age 30, while in Tunisia, in 1977, about 85% were 30 or older. Numerous determinants control such differences. These can be classified as follows:

- *demographic*—the relative numbers of married couples available at each age;

Figure 2.3. Percentage of sterilization acceptors, by age: Selected countries and years



References: See Table D.

- *past acceptances*—the proportions in each age-group not already sterilized or, secondarily, not already using a satisfactory method;
- *programmatic*—the stress given to sterilization by the family planning program, the access the program provides to facilities, the rules governing eligibility by age and family size, the costs or incentives involved, and all of these combined with the private sector's role; and
- *demand*—the degree of interest at the different ages in stopping childbearing.

All these factors mix together, resisting separate analysis, but Table D and Figure 2.3 (based on selected countries from the table) show several features of interest.

First, a very sharp peaking occurs in some cases (Figure 2.3). About 40% of the wives involved in Bangladesh, the Punjab, and Tunisia come from a single age-group. All three may involve some age misreporting, but there is no reason to question the presence of extreme age concentration. Similarly (not shown), in Brazil, the Republic of Korea in some years, certain Indian states, Singapore, and Taiwan, about 40% of acceptors are from a single age-group.

Second, the age of the peak can vary across a large range. Acceptance falls at 25–29 in Bangladesh, but at 35–39 in Tunisia. In El Salvador the peak is not so high, occurring in the 20s. In Japan (not shown), two age-groups, 25–29 and 30–34, each contain nearly 40% of acceptors.

Third, the average age at sterilization is quite young in several countries, as shown by the median ages given in Table D. This finding must in part reflect early marriage, but whatever the causes, the general pattern is clearly one that includes many young couples. Besides the high figure already noted for Bangladesh, the proportions of acceptors under age 30 are about half in India and 66% in El Salvador (41% in Singapore and 52% in Taiwan). In most countries, acceptors of various methods can be ranked by average age, with sterilization acceptors oldest, then IUD acceptors and then pill acceptors. However, there is a very large overlap in the three distributions; moreover, the average age for all three methods has been falling over time in most countries. Clearly, the body of sterilization acceptors contains substantial proportions of younger couples in most countries.

FAMILY-SIZE PATTERNS OF ACCEPTORS

Like age, the number of living children that couples have when they choose sterilization reflects several factors. All the determinants listed for age apply fully; indeed, their effects can probably be seen more clearly upon family size than upon age, which suffers from confounding with the duration of marriage. It is the number of children the couple has that produces the felt pressures within the family, not the accident of chronological age, which may not even be known in some settings.

Figure 2.4 traces the percentage distribution of acceptors by family size for several of the countries listed in Table E. As with the age data, certain countries show very sharp peaks. In Figure 2.4, the Republic of Korea and Taiwan provide examples at two or three children, and Tunisia at six or more. Bangladesh, on the other hand, illustrates a different pattern, one of a flat curve with rather even numbers at every family size from two on up.

Other analyses (not shown) of the Table E data reveal an interesting "pinching" of the curves at four children: In many countries, 20–25% of acceptors have exactly four children. This does not prevent large variations on either side, at three and five children.

Very substantial proportions of acceptors have small families. While acceptors are rather few in the zero-to-one category, they are prominent in the two category, with 10–35% there not uncommon. At three children, the percentages are even higher, in nearly all countries.

Hong Kong illustrates a determinant of the family-size patterns that hardly exists for the age patterns. Where birthrates have been low for some time and most families are small, acceptances necessarily come mainly from small rather than from large families. The base of potential acceptors at the larger family sizes is simply not present. The higher age-groups, however, still contain their own share of all couples, regardless of past acceptances. The restriction of denominators for the higher family sizes probably acts to sharpen the disparities between countries in acceptor patterns by number of children, since birthrates fall faster in some than in others.

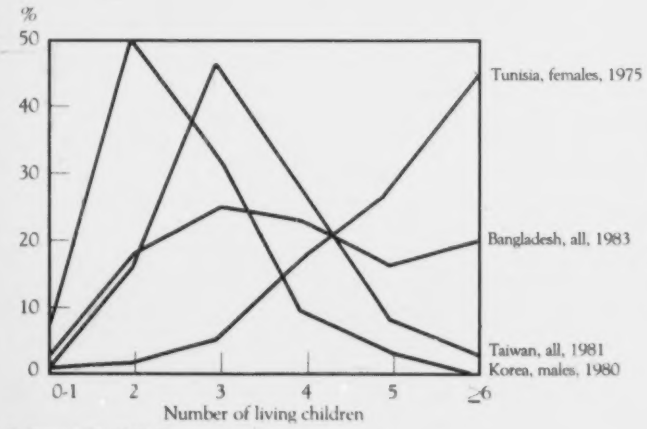
Figure 2.5 provides time trends in acceptors' family size (taken from Table E) for illustrative countries. Each line represents the experience of a different country, tracing the decline in family size over time. As the figure suggests and as Table E confirms, declines are essentially universal, even though levels vary greatly. In Thailand, the Republic of Korea, Singapore, and India, the median number of children among couples choosing sterilization had fallen to 2.5–3.5 by the mid- to late 1970s, and no sign of leveling off had yet appeared. Interestingly, the downward slopes are not much different from one another. Thus, while all countries show declines, their relative positions have not changed.

The reasons for the universality of such declines, which have been noted for other methods and for age as well as family size, have been examined (Ross, 1979; Ross and Potter, 1980). Saturation of the upper age-groups with users may play a role, but the more likely reason is a growing proclivity among the young to want contraceptive protection, including sterilization.

AGE DIFFERENCES IN PREVALENCE

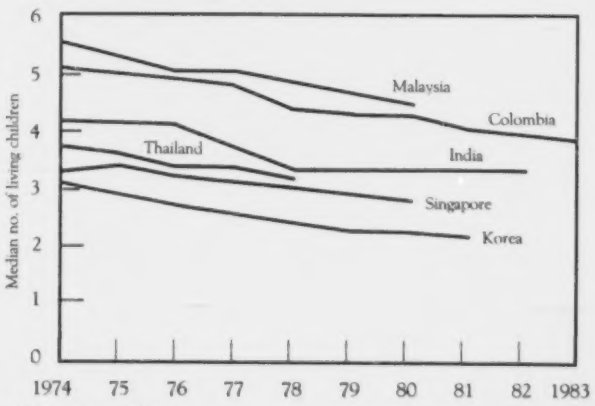
The proportions of couples protected by sterilization should be higher in the upper age-groups than in the lower ones, not only because couples may be somewhat older when they choose sterilization (with major exceptions as noted in Table D) but also because the older groups have had more years during which sterilizations could accumulate. In most countries, these two factors produce peak prevalence figures at ages 35–39 or an adjoining age-group (Figure 2.6). There is, however, always a certain competition between age at acceptance and current age in determining the age of highest prevalence. If enough young couples have recently chosen sterilization, clearly the peak can be at that early age.

Figure 2.4. Percentage of sterilization acceptors, by family size: Selected countries and years



References: See Table E.

Figure 2.5. Median family size of sterilization acceptors: Selected countries (for females or all, except Korea is for males)



References: See Table E.

Failing this, however, we expect the peak to exist at the older ages, for the reasons given. In time, if age-specific acceptance rates stabilize, every cohort of women will experience the same accumulation of sterilizations among its members, and the curves will assume Panama's pattern (not shown), of no falloff at all. Synthetic rates have been calculated for several countries under such assumptions (Westoff et al., 1980; Gómez Barrantes et al., 1983).

Figure 2.6 illustrates the variety of sterilization prevalence by age in five countries. Bangladesh is at a rather low level, with a softly rounded shape (Nepal and the Philippines have nearly identical patterns; see Table F). Just above Bangladesh comes Colombia, at a higher level and with more sharply defined age differences.

China and India are next. They are similar in overall prevalence and even in pattern, but the underlying dynamics are surely different. While couples in the two countries may choose sterilization at about the same ages, Indian couples marry earlier and so have more children beforehand. Moreover, the Chinese make extensive use of other contraceptive methods, with an all-method prevalence of 69% in 1982, about double that of India.

Puerto Rico has both the highest and youngest age pattern among the five shown, and these two features are responsible for its very high total prevalence. As regards the age pattern, no country in Table F peaks below age 35-39.

FAMILY-SIZE DIFFERENCES IN PREVALENCE

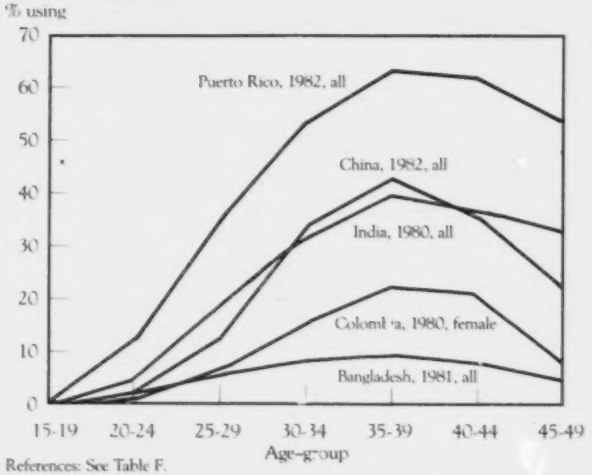
Family-size patterns in prevalence can be surprisingly unlike those for age, as illustrated by a comparison of Figures 2.6 and 2.7. The consistent falloff at the higher ages is much less evident at the larger family sizes. (We do not have the necessary breakdowns to determine whether prevalence rises for each family-size group within the five-or-more category, although information for Bangladesh is given in note 1 in Table G.)

As indicated in the preceding section, prevalence *can* fall off at the upper ages and parities if those women were more conservative or passed through their high-risk years before services were easily available. With family size, there is the added factor that it was the failure to practice contraception, for whatever reason, that in fact produced the high parity.

As desired and actual family sizes fall, we expect prevalence at the lower parities to rise. Moreover, the low-parity groups will gradually come to dominate numerically, so that even though prevalence is high at the upper parities, it will have little effect on the overall proportion protected in the total childbearing population.

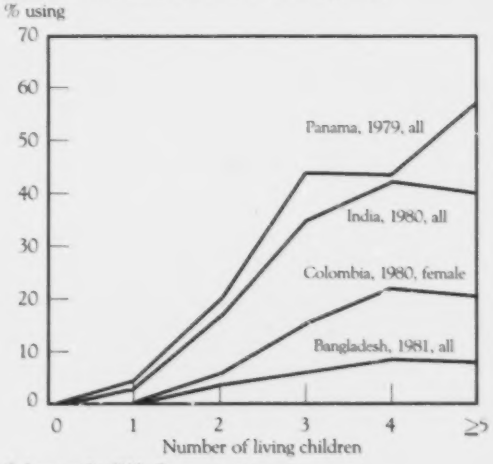
There is a further difference between age and parity patterns. As prevalence rises, it tends to do so in every age and family-size subgroup; but while sterilized persons inevitably move into the next age-group, they never leave their parity group. Denominators differ also: The base of persons in every age-group will generally follow a normal pattern through time, maintaining a substantial size in each group. But the base of persons with six or seven children will rapidly shrink as fewer couples progress to large family sizes and as high-parity women pass age 45; consequently, even a modest

Figure 2.6. Sterilization prevalence, by age: Selected countries and years



References: See Table F.

Figure 2.7. Sterilization prevalence, by family size: Selected countries and years



References: See Table G.

number of sterilizations can produce very high prevalence within those groups.

The change through time in prevalence for any five-year age-group depends strictly upon changes in the numerator of married sterilized women (or spouses) and the denominator of married women. These changes reflect aging in and out, changes in marital status, and new sterilizations within the age-group (numerator only). The analysis is the same for any family-size group, except that aging matters only at the broad boundaries of 15 and 44; and the denominator of married women with, say, four children depends in turn upon the several determinants of the parity/family-size distribution, including sterilizations at all lower parities that prevent women from ever having four children.

As with age, a fixed annual schedule of sterilization rates at each parity will, all else equal, finally produce unchanging curves for Figure 2.7. Unlike the age curves, however, these can peak at a low or middle parity and then fall at high parities. Prevalence could, for example, be high among those with four children and very low among those with seven.

EDUCATION DIFFERENCES IN PREVALENCE

Education affects the use of sterilization in most countries, but in quite diverse ways. There is no single pattern, apart from a tendency for prevalence to be less in the lowest education groups. In the Republic of Korea, the Philippines, and Thailand (Figure 2.8), the more education a woman has, the more likely she or her spouse is to have had a sterilization, while elsewhere (for example, Bangladesh and Colombia) prevalence falls in the highest education group. The latter occurs in both high-prevalence and low-prevalence countries—for example, Panama (1976) and Mexico (1976–1977).

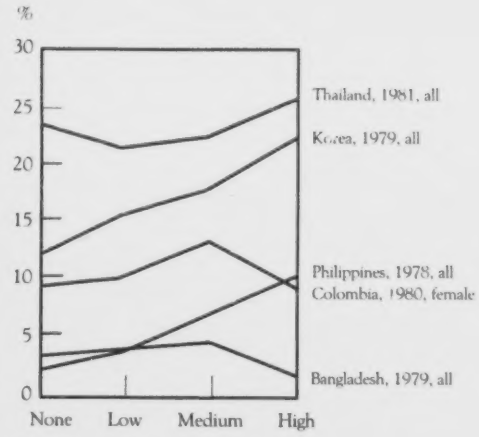
Note that the education axis in Figure 2.8 is arranged for convenience. Definitions of educational levels vary greatly.

RESIDENCE DIFFERENCES IN PREVALENCE

Originally, all countries must have had greater sterilization activity in the cities, where the necessary medical facilities and personnel were located. With time, however, some rural populations have come to enjoy better access as a result of simpler techniques, programmatic outreach (as with mobile teams), and easier travel into the cities. Thus, in some countries, sterilization prevalence in rural areas has grown as fast as or faster than prevalence in urban areas.

Examples of impressive rural levels, or increases, relative to urban ones, shown in Table I include those occurring in Bangladesh, Colombia, Costa Rica, Guyana and Jamaica. Fiji and Panama might also be mentioned, although their rural sectors probably merge considerably with their urban ones. Note that Table I gives data for only one year for some of these countries, but in those cases the rural level compares well with the urban one. Updated figures for the Republic of Korea and other countries, as yet unavailable, are needed to show the effects of the recent influences mentioned above. Indonesia has lower prevalence in rural areas than in urban areas, partly because of the inactivity of rural physicians trained in sterilization techniques, and also because of programmatic ambivalence concerning the official status of the sterilization method.

Figure 2.8. Sterilization prevalence, by wife's education: Selected countries and years



Note: Data are taken from categories in Table H.
Definitions of low, medium, and high education vary greatly.

GLOBAL ESTIMATES OF THE NUMBER OF STERILIZATION USERS

A choice is necessary between two strategies in seeking a global estimate of the number of sterilization users. One can combine the available data with "guesstimates" in order to develop a figure for the current year, or one can use the data only, gathered at various recent dates, and accept the uncertain time referent that results. The first option was used in numerous past efforts, partly because the data were quite limited and an element of guesswork was unavoidable. We have chosen the second option, which is more satisfactory now than it was before because of the increased availability of both survey and service statistics.

Table 2.1 gives the result: As of roughly 1980, there were approximately 99 million sterilization users among couples of reproductive age in the world. For most countries, the number of users was found by multiplying the most recent prevalence figure for sterilization by the latest figure available for the number of married (or cohabiting) women of reproductive age (generally 15–44); in a few cases, however (as noted in the table), statistics are quoted directly from the sources given.

Thus, each reader can see clearly how the global estimate is built up, and can update any part of the table as new data appear. Our intent was to avoid the unspecified basis of many global estimates, and instead to put into the record a full set of objective figures.

We stress that both components of the country estimates, sterilization prevalence and the number of married women of reproductive age, have been steadily increasing for many countries, including some of the larger ones. These figures and the 99 million total, therefore, are underestimates of the actual number of sterilization users in the world today, and periodic updates are recommended.

UNMET NEED FOR STERILIZATION

The unmet need for sterilization can be only crudely estimated, since the concept itself has no exact definition. However, we can set some boundaries and suggest rough magnitudes.

Unmet need for sterilization is a subcategory of unmet need for contraception in general. It relates only to those couples who have finished their childbearing, i.e., who say they want no more births. Those not yet at that stage, those already infecund from natural causes, and those already sterilized must be excluded. An unclear category is those couples currently using some method other than sterilization, since some of them will later switch to it. Another troublesome category is women who want no more children but are currently pregnant: 4–6% of all married women (6–8% above age 30) in seven national surveys (Nortman and Lewis, 1984, Tables 1 and 3). Many of these women will soon seek temporary contraception or sterilization.

To address these questions, Table 2.2 summarizes information from analyses by Morris et al. (1981) and from Westoff and Pebley (1984). The two sources use different definitions of unmet need, and while this limits comparability, it also suggests some of the effects of different restrictions on the unmet need category.

The Morris et al. figures are given in columns 1–3. They show the percentage of all married (or cohabiting) women aged 15–44 who say they want no more children, but who are (a) not using contraception (column 1), (b) using reversible methods (column 2), or (c) using sterilization (column 3). The purpose of including this last column is to give an indication of the interest already established in the sterilization method among couples wanting no more children. Note that the base for all three columns is all women, not just those wanting no more children. Thus, the first entry in column 1 means that 24% of all married women of reproductive age want no more children *and* are not using contraception.

The *maximum* percentage wanting sterilization would be all those who have finished their childbearing but have not yet chosen sterilization. This would be the sum of columns 1 and 2, or, for example, 54% of all couples in the Republic of Korea (73% at parity four or higher) and 48% in Thailand (69% at parity four or higher). The range for all countries is 35–62% (42–76% at parity four or higher). However, such percentages must be reduced to allow for couples who know they are infecund, who are satisfied with a method they are already using, or who, for whatever reason, should not choose sterilization. An estimate closer to the mark may be column 1: the percentage who are not using any method—for example, 24% in the Republic of Korea and 25% in Thailand. Here the range is 14–45% (18–56% at parity four or higher). These figures are too low because they omit some couples who, though already using a contraceptive method, find it unsatisfactory and will switch to sterilization; at the same time, they are too high because they include infecund couples.

The estimates from Westoff and Pebley* in columns 4 and 5 are lower, because of more restrictive definitions. In particular, they exclude women wanting no more children who are pregnant as of the survey. This is probably unfortunate since these women want this conception to be their last, and they will be fully eligible for a permanent method when they deliver. As noted above, they represent 4–6% of all married women wanting no more children, and they should be added to the figures given.

Column 4 shows the percentage of all women who want no more children and, though fecund and nonpregnant, are not using any contraception whatever. Column 5 is the same, except that it adds in those who are using relatively ineffective methods (any method other than the pill, the IUD, the injectable, sterilization, or the condom). The two columns are not greatly different on average: The mean for column 4 is 14% and for column 5, 19%; however, the difference is larger for certain individual countries. The range in column 4 is 5–22%, and in column 5 it is 9–35%.

The disparities among the above analyses make clear that unmet need is not easily estimated. The figures given are deliberately stated as ranges, and they follow various definitions. Even so, it is clear that substantial proportions of all couples fall into the unmet need category. By the most restrictive definition (column 4), about half of the countries studied show one-seventh or more of couples in need of a reliable, permanent method of avoiding unwanted childbearing. By alternative definitions the proportions are larger, and in certain countries they are large indeed.

*Westoff and Pebley compared 11 different definitions of unmet need for contraception. The two definitions used here in columns 4 and 5 seem most reasonable and most useful for discussion alongside figures from Morris et al.

Table 2.1. Estimated number of couples currently using sterilization: Selected countries

Country	Prevalence[1] Year	Prevalence[1] Percentage	Number of married women of reproductive age, in millions (circa 1980 unless specified)[2]	Number of users (in 000s)[3]
Africa and Middle East				
Botswana	1976	0.2	0.1	0.2
Egypt	1982	1.2	6.5	78.0
Ghana	1979	0.5	1.9	9.5
Kenya	1977–78	0.9	2.5	22.5
Lesotho	1977	0.7	0.2	1.4
Morocco	1981	1.0	3.2	32.0
South Africa	1975–76	5.2	4.1	213.2
Sudan (North)	1979	0.3	3.2	9.6
Tanzania	1976	0.0	3.3	0.1 (1976)[4]
Tunisia	1982	4.5	0.9	42.5 (1982)[4]
Subtotal				409.0

Continued on next page

Table 2.1. Estimated number of couples currently using sterilization: Selected countries *(continued)*

Country	Prevalence[1] Year	Prevalence[1] Percentage	Number of married women of reproductive age, in millions (circa 1980 unless specified)[2]	Number of users (in 000s)[3]
Asia				
Bangladesh	1981	4.8	16.2	777.6
China, People's Republic of	1982	24.5	170.0 (1982)	42,475.0 (1982)[4,5]
Hong Kong	1981	17.7	0.7	124.4
India	1982	20.6	137.8	24,472.8 (1981–82)[4]
Indonesia	1981	1.0	25.4	254.0
Iran	1978	0.0	6.6	2 (1978)[4]
Iraq	1974	0.6	2.0	12
Japan	1974	8.2	20.3	1,666.4
Korea, Republic of	1982	28.4	6.0	1,704.0
Malaysia	1981	5.0	2.1	84.8 (1981)[4]
Nepal	1981	5.3	2.7	143.1
Pakistan	1980	0.6	14.4	86.4
Philippines	1982	11.8	7.1	837.8
Singapore	1977	22.0	0.4	79.7
Sri Lanka	1982	20.7	2.1	434.7
Syria	1978	0.4	1.2	4.8
Taiwan	1981	19.6	2.4	470.4
Thailand	1981	22.9	6.8	1,557.2
Turkey	1978	0.7	7.4	51.8
Yemen Arab Republic	1979	0.2	1.7	3.4
Subtotal				75,242.3
Europe				
Belgium	1975–76	5.1	1.7 (1970)	85.6
Bulgaria	1976	1.5	1.7 (1975)	25.1
Czechoslovakia	1977	2.9	2.6	74.8
Denmark	1975	12.8	0.7	87.2
Finland	1977	4.8	0.7	32.9
France	1978	7.3	8.2	594.0
Hungary	1978	2.8	1.9	51.9
Italy	1979	2.4	8.9 (1973)	213.6
Netherlands	1982	20.0	2.3	720.8 (1981)[4]
Norway	1977	6.4	0.6	38.4
Poland	1977	4.9	6.2	301.0
Portugal	1979	3.7	1.6 (1973)	57.7
Spain	1977	0.3	5.6 (1978)	16.4
United Kingdom	1976	18.0	8.3	1,468.7
Yugoslavia	1976	10.0	4.0 (1971)	400.6
Subtotal				4,168.7

Table 2.1. Estimated number of couples currently using sterilization: Selected countries *(continued)*

Country	Prevalence[1] Year	Prevalence[1] Percentage	Number of married women of reproductive age, in millions (circa 1980 unless specified)[2]	Number of users (in 000s)[3]
Latin America and Caribbean				
Barbados	1980–81	14.7	0.04	5.9
Brazil	1981	≥10[6]	17.7	1,770.0
Colombia	1980	10.8	3.2	345.6
Costa Rica	1981	18.0	0.3	54.0
Cuba	1980	15.8[7]	1.7	268.6
Dominican Republic	1980	21.0	0.7	147.0
Ecuador	1982	12.4	1.0	124.0
El Salvador	1978	18.0	0.6	108.0
Guadeloupe	1976	7.8	0.05	3.9
Guatemala	1983	11.2	1.1	123.2
Haiti	1977	0.6	0.8	4.8
Honduras	1981	8.2	0.5	37.7
Jamaica	1979	9.8	0.3	29.4
Martinique	1976	9.0	0.05	4.5
Mexico	1982	13.7	9.8	1,530.0 (1979)[4]
Nicaragua	—	—	0.4	0.3 (1976)[4]
Panama	1979–80	29.7	0.3	89.1
Paraguay	1979	2.8	0.4	11.2
Peru	1981	4.5	2.4	108.0
Puerto Rico	1982	45.2	0.4	180.8
Venezuela	1977	8.2	2.1	172.2
Subtotal				5,118.2
Oceania and Pacific				
Australia	1979	22.2	2.4 (1976)	532.8
Fiji	1978	17	0.1 (1976)	17.0
New Zealand	Late 1970s	≥30[8]	0.5 (1981)	132.7
Subtotal				682.5
North America				
Canada	1984	43.5	4.0	1,719.6
United States	1982	27.9	31.3	11,643.0 (1982)[1,4]
Subtotal				13,362.6
Total				98,983.3

Notes and References

1. Prevalence for all countries is from Table B and Table C. It is taken from Table C for countries where prevalence can be differentiated by contraceptive and noncontraceptive reasons, and the sum of the two is used. For other countries prevalence is from Table B. Note that for the United States, only contraceptive sterilizations are included, since hysterectomies occur chiefly at late ages (see Table F). In the case of the United States, unlike other countries, including hysterectomies would raise the total appreciably.
2. Except for data for China and Taiwan, all numbers are from unpublished estimates by the United Nations, Population Division, 1984. For China, information is from China, 1983 (the 1982 CSFPC survey); for Taiwan, Nortman, 1982.
3. In most cases the number of users is the product of prevalence and the number of married women of reproductive age. Because numbers in this column have been rounded, the product of the third and fourth columns may not equal the number given in this column.
4. Statistics are quoted directly from a source for the year specified.
5. Number slightly exceeds the product of prevalence and the number of married women of reproductive age, but is reported directly from the 1982 national survey, as are prevalence and MWRA.
6. For Brazil there is no national prevalence figure; we have used 10% as a conservative estimate for this calculation. Prevalence from local surveys (Table B) is well above 10%.
7. For Naranjo; no national figures available.
8. "Over 30" is the only available prevalence estimate; 30 is used for the calculation.

Table 2.2. Estimates of unmet need for sterilization among married women of reproductive age: Selected countries and years

Country	(1) % who want no more children and are not using contraception	(2) % who want no more children and are using reversible methods	(3) % who want no more children and are using sterilization[1]
Asia			
Korea, Republic of, 1979			
All parities	24	30	20
Parity ≤ 3	19	24	19
Parity 4 +	33	40	22
Thailand, 1979			
All parities	25	23	16
Parity ≤ 3	18	17	12
Parity 4 +	36	33	23
Latin America			
Brazil			
Piauí State, 1979			
All parities	45	10	15
Parity ≤ 3	31	6	9
Parity 4 +	56	14	21
São Paulo State, 1978			
All parities	19	31	16
Parity ≤ 3	15	29	11
Parity 4 +	29	37	28
Colombia, 1978			
All parities	33	29	8
Parity ≤ 3	26	25	3
Parity 4 +	42	34	14
Costa Rica, 1978			
All parities	14	25	14
Parity ≤ 3	11	23	7
Parity 4 +	18	30	26
El Salvador, 1978			
All parities	32	10	18
Parity ≤ 3	22	9	12
Parity 4 +	43	11	24
Guatemala, 1978			
All parities	34	7	6
Parity ≤ 3	20	7	3
Parity 4 +	50	7	10
Mexico, 1978			
All parities	29	20	7
Parity ≤ 3	20	16	3
Parity 4 +	39	23	12
Panama, 1979–80			
All parities	20	15	30
Parity ≤ 3	15	16	17
Parity 4 +	28	14	47
Other			
Tunisia			
Jendouba, 1979			
All parities	26	9	15
Parity ≤ 3	12	5	2
Parity 4 +	38	12	26

Country	(4) % who want no more children and are not using contraception, are fecund and not pregnant	(5) Col. 4, plus users of ineffective methods
Asia		
Indonesia, 1976	9	11
Korea, 1974	21	28
Malaysia, 1974	12	18
Nepal, 1976	18	18
Pakistan, 1975	22	23
Philippines, 1978	13	26
Sri Lanka, 1975	15	24
Thailand, 1975	16	18
Latin America and Caribbean		
Colombia, 1976	17	25
Costa Rica, 1976	5	11
Dominican Republic, 1975	13	17
Guyana, 1975	16	18
Jamaica, 1975–76	11	12
Panama, 1976	10	15
Peru, 1977–78	21	35
Other		
Jordan, 1976	11	15
Kenya, 1977–78	8	9

Note

1. Column 3 figures may vary slightly from data in other tables in this volume because of minor differences in original sources.

References

Columns 1-3 are from Morris et al., 1981, Tables 7 and 8, and are based on the CDC and Westinghouse series of surveys. Columns 4-5 are from Westoff and Pebley, 1984, Table 2, and are based upon the World Fertility Survey series.

3. LAWS AND REGULATIONS

INTRODUCTION

Laws often tend to follow new practice rather than lead it, especially when they concern a field that is undergoing basic technological change or when social policy shifts. Thus, practices may differ across various countries though laws are similar, and vice versa. In the case of voluntary sterilization, the climate of medical and legal attitudes is quite important, since the fear of criticism or of actual prosecution can certainly inhibit physicians from performing sterilizations. On the other hand, restrictive laws may be generally ignored if policy strongly favors the implementation of sterilization services. Therefore, the discussion that follows specifies the laws, but puts them in the context of actual practice as well.

DEVELOPED WORLD

Most developed countries allow voluntary sterilization for contraceptive purposes. In the United States (which accounts for 20.2% of the developed world's population), competent adults (those who are capable of making an informed decision) can undergo sterilization legally in all 50 states and all territories. There are generally no restrictions on age (above 18 or 21) or parity, and no socioeconomic constraints. Noteworthy exceptions are recipients of federally funded family planning services and residents of New York City and the state of California; these groups are subject to a 30-day waiting period and a minimum age requirement of 21 (18 in California). In Canada, voluntary sterilization is available legally for family planning purposes without requirements as to age, marital status, parity, or socioeconomic status.

Japan's Eugenics Protection Law specifically allows voluntary sterilization only for eugenic reasons. In practice, however, interpretation of this law has been broadened so that the majority of sterilizations are done for "medical reasons."

In Australia, although some doctors are reluctant to perform sterilization because of the lack of specific statutory authorization, the absence of either statutory or common-law prohibitions makes voluntary contraceptive sterilization legal. In 1977, the Royal Commission on Human Relationships recommended that doubts concerning the legality of the operation be removed, and substantial numbers of sterilizations are performed. New Zealand permits contraceptive sterilization by statute.

In the United Kingdom (Great Britain and Northern Ireland), sterilization for contraceptive reasons is a lawful medical service. Vasectomy became explicitly legal in 1972, while female sterilization is considered legal without the need for a specific statute.

Elsewhere in Western Europe (Austria, Belgium, the Federal Republic of Germany, France, Luxembourg, the Netherlands, and Switzerland), laws have undergone important changes in the last 10–15 years and are now predominantly favorable toward voluntary sterilization. Statutes and court decisions in individual countries have produced these changes, and an influential international step was taken in 1975, when the Committee of Ministers of the Council of Europe voted that voluntary sterilization should be made available for family planning purposes.

In the majority of Eastern European countries (Bulgaria, Czechoslovakia, Poland, and Yugoslavia), either voluntary sterilization is specifically permitted by law or it is not specifically prohibited and is, therefore, allowed. The USSR's law is obscure but implicitly negative.

DEVELOPING WORLD

Over the last 25 years in the developing world, the nature of legislation on voluntary sterilization has undergone a transformation, although clearly an incomplete one. Increasingly, governments have modified their laws, regulations, and practices to recognize sterilization as an approved method of fertility limitation, as distinct from a purely medical necessity in isolated cases. Thus, it is simultaneously true that much change has occurred, and that considerable legal confusion remains.

These generalizations are not of much value for any specific case. Even the largest countries, which dominate the overall picture, vary greatly. In the eight countries that contain about two-thirds of the developing world's population, the situation is as follows. China and India, which contain half of the developing world's population, not only make voluntary sterilization available, but actively encourage it. Indonesia, the third-largest developing country, has no specific law, but its policy has been cautious because of conservative religious sentiment, and sterilization prevalence is very low. Still, the national program has never totally excluded sterilization and has been able at times to reimburse reporting physicians on a per-case basis. Moreover, the large private association has undertaken physician training in major cities.

The following diverse situations exist in Bangladesh, Pakistan, Brazil, Nigeria, and Mexico, which account for another 14% of the developing world's population. In both Bangladesh and Pakistan, the penal code on intentional corporal injuries is considered not applicable to voluntary surgical contraception, and sterilization is regarded as lawful. Both governments promote the voluntary sterilization of consenting adults as part of their national family planning programs; but, in fact, many more sterilizations are performed in Bangladesh than in Pakistan.

In Brazil, the code of medical ethics permits voluntary sterilization only on medical grounds and requires consultation with two additional physicians. Criminal law is unspecific, but is easily interpreted as opposing sterilization. In practice, the procedure is considered of doubtful legality; nevertheless, physicians perform large numbers of sterilizations, many of

them with cesarean deliveries, which are reimbursed for women covered under the extensive social security system.

Nigerian laws protect surgeons who perform voluntary sterilizations. Since statistics on sterilization do not exist, however, the degree of actual availability is not known.

Mexico allows sterilization on request, although the government limits any type of publicity for voluntary sterilization to the official family planning program.

PRINCIPAL BODIES OF LAW

Islamic Law

The Koran, the main source of law for many Muslim countries, does not expressly mention sterilization. Interpretation of the Koran (*sharia*) is different among Islamic schools and scholars. Some say that there is nothing to prevent the husband or wife from undergoing sterilization. Others say that there is no provision allowing it, and that sterilization is opposed to the larger aims of the *sharia* regarding marriage (Paxman, 1980, pp. 260 and 269). Consequently, many disparities exist among countries that are nominally Muslim—from Oman, where voluntary sterilization is strictly illegal, to Bangladesh, where it is vigorously encouraged by the national family planning program. Egypt, Indonesia, Iran, Iraq, Jordan, Kuwait, Malaysia, the People's Democratic Republic of Yemen, Saudi Arabia, Syria, Tunisia, Turkey, and the Yemen Arab Republic are all Muslim, and they vary greatly both in their interpretation and degree of enforcement of general Islamic law, and in their position on sterilization.

English Criminal Law

Under this code, voluntary sterilization is considered simply a surgical operation, and physicians performing the procedure are not subject to criminal penalties if they are doing so in good faith and for the benefit of the patient. Some African countries with the English common-law tradition, such as Botswana, Ghana, Nigeria, and Zambia, follow this rule (Isaacs, 1981, p. 188).

The Indian Penal Code of 1860

This code, with some variations, is reflected in current laws and regulations in India, Pakistan, and Bangladesh. In India, when the procedure is conducted for the benefit of the person and in good faith, no penalty is imposed. As mentioned above, in Pakistan, the penal code is not applied to voluntary sterilization when performed as a family planning method, and Bangladesh does not apply the corporal injury provision of the code to sterilization.

The French Penal Code

Articles 309 and 310 of the French penal code, with their roots in the Napoleonic Code (1810), punished any act resulting in "mutilation, amputation, and privation of the use of a limb . . . or any other personal injury" (Paxman, 1982, p. 408). The view taken by the court in the Bordeaux *sterilisateurs* case of 1937, for example, was that sterilization for any purpose—for any nontherapeutic reason, for that matter—was a form of intentional corporal injury. Hence, it was illegal even when the consent of the person was obtained. This ruling influenced the French and Belgian colonies. Since gaining their independence, most of the former colonies have not clarified the issue. In France, the National College of Physicians (Conseil National de l'Ordre des Médecins) has only recently relaxed its attitude toward voluntary sterilization.

SOURCES OF DATA

Tables 3.1 and 3.2 (pages 15 and 17–21) draw principally from the following publications that summarize laws and regulations bearing upon sterilization in most countries of the world.

1. The United Nations Fund for Population Activities (UNFPA) conducted a survey of all governments, to elicit information on laws regulating two areas of fertility control: voluntary sterilization and termination of pregnancy. Results of this survey were published in 1979, in *Survey of Laws on Fertility Control*. This review, based upon extensive library research supplemented by consultation with the field offices of the UNFPA, the United Nations Development Program, and the International Planned Parenthood Federation, takes up each country separately, cites any relevant passages from the country's laws and regulations, and comments specifically upon salient points concerning actual practice, consent rules, age and sex restrictions, grounds for the operation, and facilities typically used. Subsequent publications have updated this material and classified countries into groups according to the nature of their laws.

2. Jan Stepan, who worked on the UNFPA compilation, coauthored a report in 1981, "Legal Trends and Issues in Voluntary Sterilization," which was published as part of the *Population Reports* series.

3. The United Nations included extensive sterilization information in Table 44 of its *World Population Trends and Policies: 1981 Monitoring Report*, Volume 2, Population Policies. This table lists each country and describes its law under each of the following topics: legality, age, grounds, type of sterilization, consent, and facilities/incentives. This publication updates the 1979 UNFPA one, and it also draws upon replies to the United Nations Population Policy Inquiries. In addition, it includes information from the Population Policy Data Bank of the Population Division, and from the tables in Sardon (1979).

4. The 1979–1982 issues of the UNFPA's *Annual Review of Population Law* were consulted.

5. In addition to the above, other sources were also consulted as cited in the text.

CURRENT STATUS

The legal status of voluntary sterilization throughout the world, though clearer than two decades ago, still presents considerable confusion. Countries may be classified approximately as follows with regard to the status of their sterilization provisions. (These categories parallel the columns in Table 3.1, moving from left to right.)

- *The law explicitly permits sterilization for contraceptive purposes (with varying regulations).* In 23 countries (accounting for 13.5% of the world's population), sterilization is legal as a contraceptive method and provision of voluntary steriliza-

tion services is regulated by the government. In Europe, these include 12 countries: Austria, Czechoslovakia, the Federal Republic of Germany, Poland, Spain, the United Kingdom, Yugoslavia, and all Scandinavian countries (Denmark, Finland, Iceland, Norway, and Sweden). This category also includes six countries in the Americas (Cuba, the Dominican Republic, Ecuador, El Salvador, Panama, and the United States), four Asian and Pacific countries (New Zealand, the Philippines, Singapore, and Turkey), and one African country (Tunisia). Moreover, in the United Kingdom, sterilizations are free when performed in national health service facilities. In the Philippines, a 1976 presidential decree included sterilization under health insurance coverage. In Ecuador, there are no legal barriers, but because of political barriers, the program is still not in full operation.

Table 3.1. Legal status of voluntary sterilization: Selected countries[1]

Allowed for contraceptive purposes			Status not clear because information is lacking, obscure, or contradictory	Allowed only for therapeutic, eugenic, medical, or health reasons
By specific law/regulation	By no specific law/regulation, but by interpretation of relevant laws/regulations			
Austria (1974)	Australia (1977)	Korea, Republic of (1973)	Afghanistan (1976)	Algeria (1966)
Cuba (1968)	Bangladesh	Lesotho	Albania (1952)	Bahrain
Czechoslovakia (1966, 1971, 1972)	Barbados (1968)	Luxembourg (1978)	Angola	Belgium (1958)
Denmark (1973)	Botswana	Malawi	Argentina (1973)	Brazil (1973, 1981)
Dominican Republic (1968, 1972)	Bulgaria (1968)	Malaysia	Benin (1958)	Burma (1963)
Ecuador (1982)	Canada (1979)	Mexico (1973, 1980)	Bolivia (1972)	Chad
El Salvador (1974, 1979)	Central African Republic	Monaco	Burkina Faso (Upper Volta)	Chile (1974, 1975, 1977)
Finland (1970)	China, People's Republic of	Mozambique (1980)	Burundi (1970)	Egypt
Germany, West (Federal Republic of Germany) (1964, 1976)	Colombia (1979)	Nepal	Cameroon (1965)	Greece (1950)
Iceland (1975)	Costa Rica (1976)	Netherlands	Gambia	Iran (1976, 1980)
New Zealand (1977, 1978)	Cyprus	Nigeria	Germany, East (East German Democratic Republic) (1968)	Japan (1948)
Norway (1977)	Ethiopia (1976)	Pakistan	Guinea (1965)	Jordan (1959)
Panama (1941)	Fiji	Papua New Guinea	Haiti	Kuwait
Philippines (1973, 1976)	France (1983)	Portugal (1977)	Hungary	Madagascar
Poland (1969)	Ghana	Puerto Rico (1974)	Indonesia (1980)	Mali (1961)
Singapore (1974)	Grenada	South Africa (1980)	Ivory Coast (1982)	Malta
Spain (1983)	Guatemala	Sri Lanka	Lebanon	Mauritania
Sweden (1975)	Guyana	St. Lucia	Liberia	Mongolia
Tunisia (1973)	Honduras (1964)	Sudan	Mauritius	Nicaragua (1949)
Turkey (1983)	Hong Kong	Switzerland	Morocco	Oman
United Kingdom (1972)	India (1963)	Taiwan (1974)	Niger (1961)	Peru (1977)
United States (1960, 1970)	Iraq (1980)	Thailand	Paraguay	Rwanda
Yugoslavia (1951) (Croatia, 1978; Slovenia, 1977)	Ireland, Republic of	Trinidad and Tobago	Romania	Saudi Arabia (1975)
	Israel	Uganda	Senegal (1965)	Somalia (1962)
	Italy (1978)	Vietnam	Sierra Leone	Syria
	Jamaica	Zambia (1965)	Swaziland	Togo
	Kenya (1968)	Zimbabwe	Tanzania	Venezuela (1971, 1977)
			USSR (1960)	Yemen Arab Republic
			Zaire (1930, 1940)	Yemen, People's Democratic Republic of

Note

1. Years of known important changes are given in parentheses.

References

UNFPA, 1979a, 1979b, 1980, 1981, 1982a, 1982b; UNDIESA, 1982, forthcoming; Paxman, 1984; Stepan, 1983; Stepan and Kellogg, 1974; Stepan et al., 1981; Isaacs, 1983a, 1983b; Isaacs and Cook, 1984; UNDIESA and UNFPA, 1982a, 1982b.

- *By interpretation, the law permits sterilization for contraceptive purposes or exempts doctors performing contraceptive sterilization from penalty under the criminal code.* Fifty-four countries (containing 59.0% of the world's population) fall into this group. These include the largest Asian countries (except Indonesia)—China, India, Bangladesh, and Pakistan—as well as the Republic of Korea and Thailand. In these countries (less so in Pakistan), voluntary sterilization is actively presented to the public as an attractive method. As mentioned above, Mexico allows sterilization, but forbids any type of publicity in support of voluntary sterilization outside the official family planning program (UNDIESA, 1982, p. 667).

  Some Western governments give de facto encouragement to voluntary sterilization by including it in their national insurance plans. In the Netherlands, for example, sterilization is free to all persons with medical insurance, and in Switzerland, charges may be applied against health insurance when sterilization is done for a medical indication. On the other hand, in Australia, where sterilization is regarded as legal, there is no specific statute making it so (above), and some physicians still hesitate to provide the operation. In the Republic of Ireland, female sterilization is virtually unobtainable except for medical reasons, and male sterilization is carried out only on a very limited scale.
- *The legal situation is unclear.* Twenty-nine countries belong to this category (14.5% of the world's population; 5.8% in the USSR), for which the laws contain terminology that is so vague as to provide no useful information. Examples are such phrases as "punishable with consent" (Bolivia), "reasonable" (Gambia), or "social danger" (Albania, Hungary, USSR). Because of the obscurities involved, interpretations of the laws vary.
- *Explicitly or by interpretation, the law forbids sterilization except for therapeutic, hygienic, medical, or eugenic reasons.* Table 3.1 lists 29 countries, containing 11.9% of the world's population, in this category. A few of these are said to prohibit sterilization absolutely and under all conditions, but it is not clear whether they actually do so.

  Even in countries where voluntary sterilization is officially allowed only for medical or eugenic reasons, it can be performed for other reasons under that guise. Moreover, the distinction between a sterilization done for contraceptive intent and one done for therapeutic reasons is not always clear. This is true most notably in Japan, as well as in Jordan, Kuwait, and Venezuela. In developing countries, it may be difficult for both the physician and the patient to distinguish health reasons from socioeconomic reasons, especially if the patient is nutritionally deprived. In Belgium, legal doctrine has held that voluntary sterilization is a crime; but in practice, voluntary sterilization is commonly done for contraceptive reasons, and no physician has been prosecuted recently for performing it. In Egypt, although Islamic law is observed, which allows sterilization only for therapeutic or eugenic reasons, in practice women meeting certain demographic requirements can have sterilization on request.

Overall, as of 1983, 73.3% of the world's population (countries in the first two categories shown in Table 3.1 plus Japan and Belgium, where practice is liberal) lived in countries where sterilization was explicitly legal with only minor regulations (if any), or where it was "allowed" and where in practice it was available for contraceptive purposes. Nevertheless, for the remaining 26.7% of the world's population, sterilization for contraceptive purposes is illegal or inaccessible, or the situation is unclear.

CONDITIONS AND LIMITATIONS

Most governments that make sterilization legal or permit it by simple omission from their legislation still set certain limitations and conditions (see Table 3.2).

Consent of Spouse, Parent/Guardian or Others

Spousal consent is required in many countries for voluntary sterilization, just as it is for other medical operations. Examples suggesting the variety of such countries are Brazil, Jordan, Lebanon, Malaysia, Mali, Mexico, Puerto Rico, and Switzerland (Table 3.2).

Parental or guardian consent is required for minors, incompetents, or the mentally ill in Denmark (incapable), Egypt (incompetent), Ghana (incompetent), Hong Kong (minor), Iceland (older than 25 and incompetent), Norway (mentally ill or minor), Singapore (under 21 years and unmarried), and South Africa (incompetent).

Also, for incompetent cases and minors, in Yugoslavia, the decision must be made by a commission at the request of the parents or guardians, and in South Africa, the procedure must be certified by two physicians and authorized by a legal representative and the Minister. In the Federal Republic of Germany, according to an appeals court decision in November 1982, a "third party" (parents/curator) cannot consent to sterilization on behalf of an incompetent person (UNFPA, 1982a). In Honduras, three competent physicians must decide in all cases.

In the United States, the legal status of sterilization for mentally incompetent persons who cannot give informed consent to the sterilization procedure is often unclear and varies by state. However, federal regulations are quite specific that federal funds must not be used for sterilization of the mentally incompetent, without going through a special court procedure, and in practice such cases are rare. Many states have enacted strict procedural safeguards to protect the rights of the person to be sterilized. A number of other states have repealed old compulsory sterilization laws that allowed sterilization upon the request of a parent or guardian, a superintendent or other official of a public institution, or a psychiatrist, but have not replaced these laws with new enabling statutes. In states where there are no relevant laws, the courts may authorize sterilizations for mentally retarded individuals.

Minimum Age, and Number and Sex of Children

Among the countries for which information is available on age requirements, almost all specify a minimum age only for women. Laws in several countries (Belgium, Bulgaria, Japan, New Zealand, South Africa, and Switzerland) use words such as "mature person," "adult," "majority," or "no minor," without mentioning an exact age. Australia, Denmark,

Ecuador, the Federal Republic of Germany, Iceland, Norway, Sudan, and Sweden give the mature age as 25. Finland and Turkey give 18, while the United Kingdom gives 16. India specifies a minimum age for both men (25) and women (20). The only other countries that specify a minimum age that is below 30 are Cuba, Iran, and Panama.

Other countries with specific age limitations seem to specify an older cutoff than the conventional maturity/majority age. For example, 15 countries representing all regions of the world specify at least age 30 or 35.

In some countries, requirements combine age with the number and sex of children. Examples are Cuba (age 28 and three children), Egypt (age 35, three children and at least one boy), Israel (age 30 and multipara), and Lebanon (age 30 and at least three children). In Mexico, the minimum age and parity requirements are 35 with one or more children or less than 35 with three or more children. Similarly, in Kenya a woman has to be 30 years old and have four or more children or be less than 30 and have six or more. The Dominican Republic has a unique graded system: A woman can have sterilization on request if she is 40 years old with one child, 35 with three children, 30 with five children, or 25 years with six children.

Countries requiring at least two children include Bangladesh and Iran. In Ethiopia, Panama, and Uganda, five or more children are required before a sterilization can be obtained. Pakistan, like Egypt, requires not only a small number of children, but also a certain distribution by sex: three children, including at least one son. In China, where the one-child family is strongly promoted by the government, women with only one child are discouraged from undergoing sterilization; but recent information suggests that after the second child, it may be encouraged there ("China steps up . . .," 1983, p. 3).

RECENT CHANGES

As the family planning movement has become more prominent, most legal changes have been in the direction of liberalization, often occurring at a time when voluntary sterilization is being incorporated into the national family planning program. Official encouragement of sterilization has taken the form of monetary or other incentives in China, India, the Republic of Korea, Singapore, and Sri Lanka. Although the general trend is toward legalizing sterilization for contraceptive purposes, with generally positive changes in Asia and Europe, a mixture of positive and negative changes have occurred in the Middle East (positive in Turkey, negative in Iran), and Latin America (positive in Colombia and Mexico, negative in Chile and Peru).

During 1973–1983, favorable changes were made in the following countries, where voluntary sterilization is now "legal with special provisions": Austria, Denmark, El Salvador, the Federal Republic of Germany, Iceland, New Zealand, Norway, the Philippines, Singapore, Spain, Sweden, Tunisia, Turkey, and Yugoslavia. During this period, legal changes without specific provisions occurred in Colombia, Iraq, Italy, Luxembourg, Mexico, Portugal, and Taiwan. Mozambique changed its position from listing sterilization as illegal in 1956 to making it a part of the family planning program in 1980. In France, the National College of Physicians relaxed its attitude toward voluntary sterilization in 1983: The former code of medical ethics had permitted sterilization only for very serious medical reasons, but the word "medical" was deleted, so that the decision was left to the doctor (Isaacs, 1983a).

The new criminal code of the Ivory Coast, adopted in 1982, makes the performance of a sterilization a crime punishable by death except that if it is done by a physician in good faith and with the consent of the patient, it is not a criminal offense. Although in this sense the new penal code is a progressive measure, the full implication of the law is unclear (Stepan, 1983; Isaacs and Cook, 1984).

On the negative side, legal changes resulting in greater restrictions on voluntary sterilization have also been made. In 1980, Iran repealed a 1976 law that had permitted sterilization on request. Saudi Arabia banned all contraception by royal decree in 1975. In 1975, Chile's Ministry of Health repealed a 1974 law that had allowed sterilization on socioeconomic grounds, and instead made sterilization legal for therapeutic reasons only. Peru declared sterilization for contraceptive purposes illegal by ministerial regulation in 1977.

Table 3.2. Requirements for sterilization: Selected countries[1]

Country	Consent by someone other than the acceptor	Minimum age (for women, unless otherwise specified)	Minimum number and sex of children	Other specifications
Algeria	Spouse			Therapeutic/eugenic only
Argentina	Spouse, required by most physicians	Unclear		
Australia	Spouse, requested by most physicians	25; under 25 if not contrary to good morals		
Austria	No requirement	No minor under 18		On request
Bangladesh		Unclear	2	On request
Barbados				On request
Belgium	Spouse, in practice	Mature		On request[2]

Continued on next page

Table 3.2. Requirements for sterilization: Selected countries[1] *(continued)*

Country	Consent by someone other than the acceptor	Minimum age (for women, unless otherwise specified)		Minimum number and sex of children	Other specifications
Botswana	Spouse, in practice	None			On request; females only
Brazil	Spouse, as with other surgery				On request, in practice
Bulgaria	No requirement	Mature			
Canada	No requirement	None		No requirement	On request
Chile	Acceptor and spouse, written	30	and	4; at least 2 boys	Only for specific diseases listed by Ministry of Health
China, People's Republic of	No requirement				On request
Colombia	Spouse	30	and	2	On request. These norms are for female sterilization.
		Under 30 for medical and social reasons	and	2; at least 1 of each sex	
Cuba		28	and	3	On request in hospitals of the National Health System
Czechoslovakia	No requirement	35	and	3	On request or for medical/genetic reasons
		Under 35	and	4	
Denmark	Parents/guardian for those incapable of giving informed consent; authorization of special committee for those under 25	25 (age of maturity); under 25 for eugenic or social reasons; under 18 for special reasons			On request; must live in Denmark; operation should be no later than 6 months after approval
Dominican Republic	No requirement	40	and	1	On request
		35	and	3	
		30	and	5	
		25	and	6	
Ecuador	Acceptor, written	25		3	On request
Egypt	Acceptor, written; parents/guardian for incompetent patients	35	and	3; at least 1 boy	On request
El Salvador	Spouse	None		No requirement	On request
Ethiopia	Spouse requested	35 preferred		5	Females only
Fiji	Acceptor and spouse, written before medical officer				On request; married couples only
Finland	Spouse not required, but must be informed	Under 18 only for particularly cogent reasons			
France[3]	Spouse desirable	None		No requirement	2-month waiting period
Germany, East (East German Democratic Republic)	No requirement	None			
Germany, West (Federal Republic of Germany)	No requirement	25 ("mature")			On request

Table 3.2. Requirements for sterilization: Selected countries[1] *(continued)*

Country	Consent by someone other than the acceptor	Minimum age (for women, unless otherwise specified)	Minimum number and sex of children	Other specifications
Ghana	Parents/guardian for incompetent persons	None		Sterilization not permitted for contraceptive purposes.
Greece	No requirement			For medical reasons only
Guatemala	Spouse	Unclear		
Honduras	Acceptor, written			Decided by 3 competent physicians
Hong Kong	Parents/guardian for minors	None		
Iceland	Parents/guardian for incompetent persons aged 25 and older; approval of two specialist physicians and chief medical officer for persons under 25	25; under 25 if mother is endangered by pregnancy or unable to physically or economically care for child; for eugenic reasons		On request
India	No requirement	Male: 25 Female: 20		On request; 45 maximum age for women
Indonesia	Spouse, written			Only on medical grounds; on request at designated institutions
Iran	Spouse	If married, both husband and wife must be over 25; if unmarried, man or woman must be over 30	2 if married	On request
Ireland, Republic of	Acceptor and spouse, written			
Israel	Spouse, informed and written	30 and	Multipara	
Italy	No requirement	None	No requirement	On request
Jamaica	Spouse, encouraged as with other surgery	35; older preferred		On request
Japan	Spouse	Minors only for genetic reasons		Only for genetic, health, "life" grounds
Jordan	Spouse, as with other surgery	30		Only for medical, eugenic reasons
Kenya	Spouse; parents/guardian if no spouse	30 and Under 30 and	4 or 5 6	On request
Korea, Republic of	No requirement	None	No requirement	On request
Kuwait	Spouse	None		Only for medical, eugenic reasons; mainly female
Lebanon	Spouse, as with other surgery	30 and	3	On request
Lesotho		Mostly 35-45	Many	Females only
Malaysia	Spouse, as with other surgery			Medical and socio-economic reasons

Continued on next page

Table 3.2. Requirements for sterilization: Selected countries[1] *(continued)*

Country	Consent by someone other than the acceptor	Minimum age (for women, unless otherwise specified)	Minimum number and sex of children	Other specifications
Mali	Spouse, as with other surgery			Only for medical indication
Mexico	Spouse, as with other surgery	35 and Under 35 and	1 3	On request
Mozambique	Spouse	35		On request
Nepal				On request
Netherlands	No requirement			On request
New Zealand	No requirement	No minors		On request
Norway	Parents/guardian for mental cases or persons under 20; a legal representative if acceptor is not capable	25; 18-25 for health/social/eugenic reasons only and authorization must be obtained; under 18 for imperative reasons only		On request; must live in Norway
Pakistan	Spouse for females		3; at least 1 boy	On request
Panama	Spouse, in practice	26, in practice	5	On request; when in difficult socioeconomic situation, may be authorized by the Sterilization Board
Philippines	Spouse	None		On request
Poland	Spouse, informed and mature	None		On request and justified by physician
Puerto Rico	Spouse, as with other surgery	None		On request
Singapore	Parents/guardian for under 21 and unmarried	None		On request for all married persons
South Africa	Incompetent persons may be sterilized if (a) 2 physicians attest to the existence of genetic dangers or mental incapability of parenthood, (b) the legal representative of the person consents, and (c) the Minister authorizes sterilization	No minors except handicapped		On request
Spain[4]	No requirement	Competent adult	No requirement	On request
Sri Lanka	No requirement	None		On request
Sudan	Spouse	25	3 or 4; at least 1 boy	On request
Sweden	Spouse	25; 18-25 if approved by Board of Health and Welfare, only for genetic or medical reasons, or sex change		On request; must live in Sweden
Switzerland	Spouse, as with other surgery	Competent adult	No requirement	On request
Tanzania	Spouse			

Table 3.2. Requirements for sterilization: Selected countries[1] *(continued)*

Country	Consent by someone other than the acceptor	Minimum age (for women, unless otherwise specified)	Minimum number and sex of children	Other specifications
Thailand	No requirement	None	1 child at least 1 year old	
Trinidad and Tobago	Spouse, in practice	None		On request; females only
Tunisia	Spouse, in practice	30	4; at least 1 of of each sex	On request
Turkey	Spouse	18	No requirement	On request, if no medical contraindications
Uganda	Spouse	40, in practice, on the advice of the Family Planning Association	9 or 10, or multiple cesareans	On request; females only
United Kingdom	Spouse advisable for marital harmony	16; under 16, therapeutic only	No requirement	On request
United States	Spouse, in a few states only	18 or 21 (varies by state)	No requirement	On request; 30-day waiting period for all Medicaid clients and in New York City and California
Yugoslavia (in Croatia and Slovenia)	Parents/guardian for incompetents (decision of a commission)	35; under 35 for health or eugenic reasons and with the approval of a special board; no minors		On request; 6-month waiting period (Slovenia); only in hospitals or in specially authorized establishments; applications screened by a commission

Notes

1. An empty cell means that no information was found on the subject.
2. The code of medical ethics still limits voluntary sterilization to a serious medical reason.
3. The National College of Physicians allows a physician to perform voluntary sterilization for serious reasons other than medical. The Medical Ethics Committee limits the procedure to women aged 35 and older with two or three children.
4. In hospitals and clinics that belong to the government or social security system, sterilizations are performed only on women aged 30 and older who have had three or more cesareans.

References

UNFPA, 1979a, 1979b, 1982a, 1982b; UNDIESA, 1982; Paxman, 1984; Stepan, 1983; Isaacs and Cook, 1984; Hollerbach and Díaz-Briquets, 1983.

4. SERVICE DELIVERY PROGRAMS

INTRODUCTION

Not all governments that allow voluntary sterilization operate sterilization programs themselves. Of those that do, some offer the method only nominally, while others give it high priority. In 1958, the government of Madras State in India was the first to officially adopt sterilization as a contraceptive method in its family planning program. In the 1960s, the governments of Bangladesh, Malaysia, Pakistan, and the Republic of Korea followed. These, in turn, were followed by the governments of El Salvador, the Philippines, Puerto Rico, Taiwan, Thailand, and Tunisia in the 1970s.

Private organizations and physicians played a major role in encouraging government involvement and providing voluntary sterilization services in the early years. Often through family planning associations, physicians have initiated sterilization services and actively promoted them. In some countries—for example, Brazil—private physicians continue to provide most of the voluntary sterilization services. In other countries, however, the medical community avoids sterilization practice, often out of fear of hostile or ambiguous legal provisions.

As of 1982, in most countries where sterilization acceptor information by sex is available, female acceptors outnumbered males (Table A). This differential appears to be at least partly related to technological advances. Some early national programs that provided sterilizations—for example, those in India and the Republic of Korea—offered vasectomy almost exclusively. In the 1970s, however, female sterilization techniques became cheaper, easier, and safer (although still inferior in these respects to vasectomy), and since that time, female sterilization has become the predominant sterilization method in most countries. It has surpassed vasectomy in the Republic of Korea since 1977, in Bangladesh since 1978, and in Nepal since 1979. In India, except during two years when the government ran a special campaign for vasectomy (1975–1976 and 1976–1977), female sterilizations have outnumbered vasectomies since 1974. Only in the Netherlands have male sterilizations consistently outnumbered tubal occlusions, in all years except 1975–1978. Vasectomy remains very important also in the United States and in Sichuan, China's largest province.

A further reason why voluntary sterilization is dominated by female procedures has been differential service availability resulting from a lack of actual services for men and negative attitudes of physicians toward vasectomy (Liskin et al., 1983, p. D-89). Where vasectomy has been strongly promoted and made easily available, and where there is little access to female methods, men have responded in substantial numbers (Jezowski and Ahmad, 1982, p. 15).

DELIVERY SYSTEMS

A variety of approaches to the delivery of sterilization services have been used: clinic-based systems, including hospitals and physicians' offices; postpartum services; mobile units; and special programs or campaigns.

Clinic-Based Delivery

Since sterilization is a medical procedure and is generally performed by a physician, services have been largely clinic-based; they are most often provided either at government or private hospitals and clinics, or at private physicians' offices. The clinic setting offers the advantages of personnel with greater depth of expertise, lab facilities, and backup resources in the event of complications. In many countries, female sterilizations are done in the larger hospitals.

Postpartum

The postpartum period is the primary occasion for voluntary sterilization in some countries, including Cuba, Jordan, Malaysia, and Puerto Rico. For women in developing countries, who have little contact with the modern medical system except at delivery, the postpartum period is often the best opportunity to obtain sterilization services. Indeed, in some countries, women may have an extra birth in order to gain access to immediate postpartum sterilization services. Postpartum programs cannot, however, easily reach women living in remote villages, whose births take place at home.

Mobile Units

The regular, sustained use of mobile units, which take the clinic to the people, is not yet a widespread practice, but it has been important in selected locations. For example, in Sri Lanka, mobile units began visiting the plantation estates to provide vasectomy services in the second half of 1972, and the Family Planning Association of Sri Lanka expanded this operation in 1974. Beginning in 1975, the National Family Planning Board of Malaysia began to operate mobile vasectomy services that focused on the rubber estates. During the late 1960s and early 1970s, the Republic of Korea operated 10 vans with teams that performed vasectomies and IUD insertions in isolated rural areas. In some locations in Indonesia, mobile teams for male and female sterilization have cooperated with local public health centers, maternity clinics, and schools to extend services. Using mobile units, Nepal operates periodic laparoscopy camps throughout the country, including mountain areas.

Although mobile approaches have many advantages over established, stationary services, they also have disadvantages. The equipment involved is expensive; maintenance can pose problems; follow-up services are, of necessity, limited; and the topography the mobile units face is often difficult. These factors tend to limit the range and frequency of mobile services, and raise questions about cost-effectiveness. For example, a mobile vasectomy program in Colombia was discontinued because of high costs and the frequency of postoperative

infection; the latter problem points up the need for adequate medical oversight. Close administrative supervision is also needed to maintain good personnel performance because of the rigor and difficulty of the work.

Special Programs

In addition to these regular service delivery channels, several governments use special approaches to family planning service delivery. For example, China during its 1983 Spring Festival took advantage of this special period, during which family members gather to celebrate a holiday, and launched a massive and highly successful campaign of information and services, including voluntary sterilization.

A few campaigns have been specifically focused on sterilization methods. At the beginning of its program, the Indian government operated intermittent mass vasectomy camps in rural areas: two in 1970–1971 through the Ernakulam Vasectomy Campaign in Kerala State, and others in Gujarat State in 1971–1972.* The concept of the camp was to concentrate a maximum effort for a short period in a given locale. This strategy was discontinued in FY 1973–1974 because of problems of service quality and a general cutback in government funds for family planning programs.

In early 1977, Bangladesh ran a nine-week sterilization campaign for both sexes; out of the 76,000 new acceptors, 70% were men.

Although special campaigns are by definition temporary, they have often attracted more acceptors in a short period than the regular program had in the previous year or more. For example, a special 1980 vasectomy campaign by Community Based Family Planning Services in Thailand relied on two mobile teams in selected rural areas. More vasectomies were performed during a five-day campaign than in the regular program during the entire year. Campaigns have certain strengths over regular programs. They tend to have better communication support, through a vigorous, focused effort; and they are easier to administer, given their restricted time, single service, and limited geographic area. Furthermore, personnel are more conscious of being observed by a higher authority and tend to do a better job than usual. Various government departments may unify their efforts under exceptional leadership, as was the case in Ernakulam. Also, the concentration of resources in a given geographic area tends to provide assured access to the service, especially where sterilization services have previously been limited or unavailable. Finally, special campaigns often provide incentives of various sorts.

These several factors tend to reinforce each other in well-orchestrated campaigns, making the special programs highly effective and efficient. However, certain problems are common as well, including failure to provide adequate follow-up attention and the tendency in some campaigns and camps to pressure staff to do too many procedures in a short period of time.

*During the first mass vasectomy camp (in 1970) in the Ernakulam district of Kerala State, 15,005 sterilizations were performed. Each acceptor was offered Rs 86 (U.S. $11.00). During the second campaign in Kerala State (in July 1971), the cash payment for acceptors was increased to Rs 114 (U.S. $14.50), and 62,913 sterilizations were performed. In a two-month effort in the 1971–1972 fiscal year in Gujarat State, 211,933 vasectomies were performed through a network of camps.

MEDICAL PERSONNEL

As a surgical procedure, sterilization carries with it more requirements and limitations than other contraceptive methods. The needs for surgical facilities and medical personnel are the major constraints to its wider availability. Although laparoscopy and minilaparotomy can be performed as outpatient procedures, both generally still require medical professionals; thus, the shortage of physicians in most developing countries, especially in rural areas, continues to constrain the provision of services.

This shortage of trained physicians to perform sterilization, and their geographic maldistribution, has led family planning program managers to test extensions of service by using paramedics, normally under medical supervision. The World Federation of Health Agencies for the Advancement of Voluntary Surgical Contraception recommends careful attention to the following points in the utilization of paramedics: training and qualifications of personnel; avoidance of endoscopic procedures; suitability of clinic facilities; and supervision by qualified physicians.

So far, paramedics have performed voluntary sterilization procedures in only a few countries. In Indonesia, vasectomies carried out by paramedics under the supervision of a physician have increased the numbers performed and reduced the cost (Samekto, 1982, p. 3). In pilot trials, nursing personnel in Thailand have successfully performed female sterilizations (World Federation, 1981, p. 7). In Bangladesh, paramedics have been trained to do minilap sterilization (Chowdhury and Chowdhury, 1975, 1976). During 1974–1976 in Bangladesh, among 1,086 tubectomies, "68.5% were performed by paramedics with an average of only two months' part-time training in tubectomy surgery" (1976, p. 207). The infection rate in operations carried out by paramedics was 5.4%, versus 5.8% by physicians (1976, p. 209). Similarly, in Thailand, there has been little difference between nurses and physicians in terms of postoperative complications (1.4 vs. 0.7%, respectively), frequency of operative difficulty (2.8 vs. 2.7%), or degree of patient satisfaction (94.4 vs. 94.6%) (Dusitsin, 1980, p. 219). The above experiences suggest that given proper training and supervision, nonphysicians can help relieve supply constraints in some countries. However, this concept has received limited acceptance to date.

FEES AND COMPENSATION PROGRAMS

This section presents information on charges and compensations in voluntary sterilization programs. It draws data mainly from the various Nortman fact books, which have carried country figures that are assembled here (Tables 4.1–4.5) for all years available.

Fees

Sterilization services are usually free of charge in national programs. A few programs charge for them, while others give

payments to the acceptor. Programs listed in Table 4.1 have provided all family planning services, including voluntary sterilization, free of charge. Programs in Table 4.2 have provided free service for sterilization only, but have charged for all other family planning methods. Botswana, Colombia, Hong Kong, Kenya, Nigeria, Singapore, Taiwan, and Thailand have charged for voluntary sterilizations (Table 4.3). In Singapore, a minimal fee is charged to ensure voluntarism. In Hong Kong, Taiwan, and Thailand, the charges for female sterilizations are higher than those for male sterilizations, while in Botswana, Colombia, and Singapore there is no difference. (In Botswana and Singapore, sterilization fees are the same as fees for IUD insertions.)

Colombia is a unique case. While services for all other family planning methods are free, sterilization acceptors have been charged since 1980. The fees vary by service provider: The Ministry of Health charges between 200 and 400 pesos (U.S. $4.90–$9.80), while the Asociación Pro-Bienestar de la Familia Colombiana (PROFAMILIA) charges 800 pesos (U.S. $19.60).

In Thailand, payment policy has changed several times over the past decade. In the early 1970s, hospitals were reimbursed on a per-case basis, which reduced their expenses and permitted better remuneration to staff. During 1971–1976, the program charged different amounts depending upon the method: Female sterilization was the most costly, followed by male sterilization, while the other methods were provided at yet lower costs. In 1977, all contraceptive services became free, except for injections and sterilizations performed in urban areas. This policy changed once again in 1979, when charges were established for all methods on the same scale as that used in 1971–1976. Rural areas were exempted from this policy, and all contraceptive services there remained free. In 1981, all methods again became free, except for injectables and IUDs provided in urban areas.

To date, the highest government program charge to acceptors appears to have been in Hong Kong, where female sterilization cost U.S. $110.00 in 1979. This price was reduced by over half in 1981. Singapore has not altered its fees since 1970, when a charge of Singapore $5.00 was established for both male and female sterilization services.

Compensation to Acceptors

Some countries under heavy population pressure have established compensation programs in addition to providing free services. These programs, which are in general use in some countries and under experimental trial in others, are of three types: cash payments related to reimbursement of travel costs, lost wages, or food while absent from home; material goods, such as milk or new clothing for sanitary reasons; and social benefits, such as education bonds, tax exemptions, retirement bonds, and social pensions.

Most compensation plans exist in Asian programs, with considerable variation in type and in value of benefits. The amounts of cash payments vary by country and time period (Table 4.4), often by acceptor's sex, sometimes by economic status, and in one case (India, 1976), by family size. In 1982, the Republic of Korea adopted a variable scale for sterilization

Table 4.1. Country programs in which all contraceptive methods were free in years indicated[1]

Country	Year
Bangladesh	1977 1981
Chile	1976
Colombia	1974 1977
Costa Rica	1975 1976
Dominican Republic	1974 1976 1977 1978
El Salvador	1976 1980
Honduras	1971
India	1969–70 1972 1974–78 1980
Indonesia	1974–77 1979 1981
Iran	1972 1974–77
Kenya	1979 1981
Mauritius	1972 1975–77 1979 1981
Morocco	1972 1974–75
Nepal	1976–77
Philippines	1971–72 1974 1976–78 1980
Puerto Rico	1976
Tunisia	1974–77
Venezuela	1972 1975

Note
1. Information lacking for years not listed.

References
Nortman, 1969-76, 1978, 1980, and 1982.

Table 4.2. Country programs in which sterilization services were free, but other methods were charged for, in years indicated[1]

Country	Year
Bangladesh	1972 1976–77 1981
Fiji	1969–70 1972 1974
Jamaica	1976
Malaysia	1969–73 1975–77 1979 1981
Pakistan	1969–70 1972 1974 1980
Sri Lanka	1970–72 1974–76 1980

Note
1. Information lacking for years not listed.

References
Nortman, 1969-76, 1978, 1980, and 1982.

acceptors officially classified as needy, paying more to parents with two or fewer children. In addition to monetary compensation, the Republic of Korea also has a social benefit program that gives favorable status for public housing and housing loans, medical insurance benefits, free medical treatment for children under age five in two-child families, and a minimum of three days' paid leave after a sterilization operation. However, since few poor people in the Republic of Korea live in public housing, and since medical insurance is not widely available, such social welfare benefits are partly symbolic.

Singapore has elaborate compensation policies, including waiver of delivery fees in government hospitals if sterilization is carried out postpartum, higher priority to the parents'

Table 4.3. Charges for sterilization, by country and sex of acceptor

Country and year	Male and female		Male		Female	
	Local currency	U.S. $	Local currency	U.S. $	Local currency	U.S. $
Botswana						
1972	0.40	0.57				
1974	0.40	0.57				
Colombia						
1980[1]	200–400	4.90–9.80				
Hong Kong						
1974[2]			25–50	5.00–10.00		
1975			100	20.00		
1977			100	22.00		
1979[2]			200	44.00	500	110.00
1981[2]			200	38.00	250	47.50
Kenya						
1984						28.00–350.00[3]
Nigeria						
1984						5.00– 98.00[4]
Singapore						
1970–81[5]	5	1.68–2.35				
Taiwan						
1974–75			600	15.60	1,200	31.20
1976–77	600–1,000	15.60–26.00	500–1,220	13.00–31.72	1,000–2,520	26.00– 65.52
1979			800[2]	22.40	500–1,500	14.00– 42.00
1981			700	19.60	1,600	44.80
Thailand						
1971			≤50	2.50	≤150	≤7.50
1972–76[2]			50	2.50	150	7.50
1977[6]			50	2.50	150	7.50
1979[6]			200	10.00	300	15.00

Notes

1. All other methods were free. Fees shown are for Ministry of Health services only. For services provided by the Asociación Pro-Bienestar de la Familia Colombiana (PROFAMILIA), acceptors paid 800 pesos (U.S. $19.60) for sterilization.
2. Free to those unable to pay.
3. The Family Planning Association charged $28; public hospitals had no charge; mission hospitals charged $7-$42; private physicians charged $200-$350.
4. University hospitals charged $98; state hospitals charged $5.
5. U.S. value varies by exchange rate.
6. Free in all rural outlets that had less than a 60-bed capacity. In all other facilities, there was a charge.

References

Nortman, 1969–76, 1978, 1980, and 1982; for Kenya and Nigeria, Dwyer, 1984.

choice of a primary school if sterilization occurs after only one or two children and before the wife reaches age 40, and seven days' fully paid medical leave for civil servants after sterilization.

Some plans take the character of disincentives; however, few are used widely. In India, some industries have used them; for example, in one case, unsterilized couples with three or more children cannot obtain company housing, and their children cannot be admitted to company schools. In another case, workers with three or more children are excluded from leave, travel concessions, home building loans, and loans for purchasing a car, scooter, or motorcycle, and female employees with three or more children do not receive maternity benefits (Khan, 1980, p. 115).

Compensation to Providers

As Table 4.4 shows, cash payments sometimes are made not only to acceptors, but also to service providers and to referrers. Providers are normally medical doctors, while referrers may be family planning workers, welfare workers, or field-workers. In some cases, persons who introduce clients to clinics are considered referrers, even when they work outside the official program.

There are several types of provider payments. Most commonly, payments are on a per-client basis; but they are also made on a per-session or even a monthly basis. Providers are normally paid much more than referrers. In Nepal, an extra payment is given to medical and other personnel working in sterilization camps in remote mountain districts, and recent medical school graduates who perform a minimum number of sterilizations or who work in family planning service organizations are given priority for further education (Nepal, 1983b, pp. 9–10).

Providers usually receive higher payments for female sterilization than for vasectomy—in the case of Taiwan, as much as 2-7 times higher in 1979. This is because female sterilization is a more extensive surgical procedure than vasectomy.

In a number of countries, family planning personnel are compensated for providing various contraceptive methods, not just voluntary sterilization, or for referring people for services (Table 4.5). This payment is usually on a monthly basis, regardless of which contraceptive method is involved. An exception occurs in the Asociación Pro-Bienestar de la Familia de Guatemala (APROFAM) clinics, where payment is per hour. Referrers, however, are still paid by the month.

Table 4.4. Cash payments to sterilization acceptors, providers and referrers: Selected countries and years

Country and year	Acceptor		Provider		Referrer/Other	
	Local currency	U.S. $	Local currency	U.S. $	Local currency	U.S. $
Bangladesh						
1972					m: 15	2.10
1975	m: 60	4.00				
1976	15	1.50				
1981	m: 96	6.40	14–16[1]	0.99– 1.14		
1982[2]	f:123	8.20	8–10[3]	0.57– 0.71		
	m:106	7.07				
Hong Kong						
1974			m: 200[4]	40.00	457– 927[5]	91.00–185.00
1975			m: 200[4]	40.00	557–1,343[5]	111.00–269.00
1977			60–200	13.20–44.00		
1979			120–200	26.40–44.00		
1981			250	48.00		
India						
1950s	30[6]	6.00	m: 25	5.00		
1959					10.00	2.00
1966	15– 20	2.00–2.50			3.50	0.50
1970–71			m: 5[7]	0.63	2	0.27
			m: 10[8]	1.33		
			f: 10	1.33		
1972–74			10	1.37	3	0.41
					5	0.69
1976	70–150[9]	8.00–17.00				
1980	70	9.03				
1982		f:22.00[10]				
		m:15.00				

Table 4.4. Cash payments to sterilization acceptors, providers and referrers: Selected countries and years *(continued)*

Country and year	Acceptor		Provider		Referrer/Other	
	Local currency	U.S. $	Local currency	U.S. $	Local currency	U.S. $
Iran						
1975			m: 1,000	15.00	150[11]	2.25
			f: 2,500	37.50		
Korea, Republic of						
1965			m: 500			
1966–68	m: 800		m: 900		m:100	
1969	m: 800	2.96	m: 900		m:100	
1970–71	m: 800		m: 1,000	3.70	m:100	0.37
1972			m: 1,800	6.67	m:150	0.56
1973			m: 2,300	5.75	m:300	0.75
1974			m: 2,500	6.25	m:300	0.75
1975			m: 3,500	7.35	m:300	0.63
1976			m: 3,600	7.56	350	0.74
			f: 5,000	10.50		
1977	f:3,000[6]	6.30	m: 5,000	10.50	350	0.74
			f:15,000	31.50		
1978	f:3,000[6]	6.30	m: 6,000	12.60	400	0.84
			f:15,000	31.50		
1979				m: 10.00		
				f: 30.00		
1981	9,000	13.50	m:14,000	21.00		
			f:17,000	25.50		
1982	30,000[12]	2.00				
	100,000[13]	140.00				
Mauritius						
1968		m: 4.50				1.85
Nepal						
1970			20	1.98		
1975			5	0.47		
1976			20	1.90		
1977			20	1.60	m: 10[7]	m: 0.80
					f: 20[7]	f: 1.60
1983	100					
Pakistan						
1970–71			m: 10	3.15	5	1.06
			f: 25	5.25		
1972			m: 15	1.50	5	0.50
1974			m: 15	1.50	5	0.50
			f: 20	2.00		
1976	m: 15	1.50	15	1.50	5	0.50
	f: 20	2.00	20	2.00	5	0.50
1980			20	2.06	10	1.03
1984	f: 40	3.00				
Puerto Rico						
1976			50	50.00		

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Table 4.4. Cash payments to sterilization acceptors, providers and referrers: Selected countries and years *(continued)*

Country and year	Acceptor		Provider		Referrer/Other	
	Local currency	U.S. $	Local currency	U.S. $	Local currency	U.S. $
Sri Lanka						
1970			5	0.85		
1979	m: 35.5					
	f: 65					
1980	m:100[14,15]	5.00				
	m:500[16]	25.00				
1983	500	20.00	m: 65	2.60		
			f: 35	1.40		
Taiwan						
1971			200	5.00	10	0.25
			300	7.50		
1972–75					20	0.52
1976			500	13.00		
			1,000–1,300	26.00–33.80	50–250	1.30–6.50
1977			m: 500	13.00		
			f:1,000–2,000	26.00–52.00	50–250	1.30–6.50
1979			m: 500–1,300	14.00–36.40		
			f:1,500–3,500	42.00–98.00		
1981			m: 500–1,200	14.00–33.60		
			f:1,200–2,600	33.60–72.80		
Thailand						
1979[17]			180– 320	9.00–16.00	180	9.00
Tunisia						
1975	f: 5.0	11.65	2.3	5.75	0.6[18]	1.50
			m: 1.3	3.25		
1977	f: 5.0	11.65	m: 2.1	5.10	0.5	1.21
			f: 1.1	2.67		

Key m: male
f: female

Notes

1. For physician. Payments were TK 14 (U.S. $0.99) for female sterilization and TK 16 (U.S. $1.14) for male sterilization.
2. For surgical apparel, additional payments were made to acceptors of TK 50 (U.S. $3.33) for females and TK 20 (U.S. $2.00) for males.
3. For midwife/nurse.
4. Vasectomy clinic.
5. Vasectomy clinic clerk per month.
6. Only for the needy.
7. In camps.
8. Not in camps.
9. Differs by parity.
10. In camps.
11. Per-case recruitment.
12. Only for families that were officially classified as "needy" and if either spouse was under the age of 40 and they had three or four children.
13. Only for needy families with no more than two children and if either spouse was under the age of 40.
14. A compensatory payment if men were under age 50 and women were under age 45. Both men and women had to be legally married and have more than two children at the time of sterilization.
15. Jan. 1980.
16. Oct. 1980.
17. For nurse or midwife, 180 Bht (U.S. $9.00); for physician, 320 Bht (U.S. $16.00).
18. Anesthetist.

References

Inayatulah, 1984; "Incentives bring results," 1982; Nortman, 1969–76, 1978, 1980, and 1982; Wright, 1983.

AVAILABILITY

A measure of the availability of sterilization to entire populations is provided by Robert J. Lapham (1984), based on his study with W. Parker Mauldin (1984).* An average of four respondents in each country were asked to estimate the percentage of couples of reproductive age having "ready and easy access" to each family planning method, meaning that no more than an average of two hours per month were used to obtain contraceptive supplies and services, and that the cost of contraceptive supplies was below 1% of the monthly wage. The investigators used the respondent information to construct scores as follows: The estimated availability percentage for the country was divided by 20, yielding a score of 0–4, with any result over 4 counted simply as 4. Separate scores were calculated for vasectomy, female sterilization, IUD, pill, condom and other, and abortion. These six scores were combined into an overall score with a maximum possible rating of 24. The vasectomy, female sterilization and overall scores are shown in Table 4.6.

Using these scores, it is possible to show the proportion of all contraceptive availability that is made up of male and female sterilization (last column). This proportion is simply the sum of the first two columns divided by the total availability score.

Six Asian countries (China, Hong Kong, India, the Republic of Korea, Singapore, and Taiwan) and two Latin American countries (El Salvador and Guatemala) show the maximum score of 4.0 for both male and female sterilization. At the other extreme, 19 countries, mostly African, report very limited availability, with scores of less than 1 for both vasectomy and female sterilization. Overall, more than 60 percent of the developing world's population (heavily weighted by China) have ready access at least to female sterilization. Availability of female sterilization is generally greater than that of male sterilization in all countries for which data have been compiled. This imbalance is especially prominent in Brazil, Colombia, Cuba, the Dominican Republic, Jordan, Malaysia, and Tunisia.

Returning to the last column of the table, we see that sterilization accounts for a substantial part of the availability of all fertility regulation methods in some countries, while in others it is only a small part. The proportion is affected, of course, by both numerator and denominator; it can be high, for example, where sterilization is only moderately available if other methods are even less available. In Malawi and the Yemen Arab Republic, where sterilization services account

*Data used by permission.

Table 4.5. Monthly payments to family planning service personnel of all types: Selected countries and years

Country and year	Doctor		Nurse/Midwife		Referrer	
	Local currency	U.S. $	Local currency	U.S. $	Local currency	U.S. $
Dominican Republic[1]						
1974	350	350	200	200	90	90
1975	350	350	200	200	110	110
1976	350	350	350	350	110	110
1977	350	350	275	275	110	110
1978	350	350	200	200	110	110
Guatemala						
1972–74[2]	450	450	100	100	165–200	165–200
1972–74[3]	3.90	3.90				
Hong Kong						
1977	2,000– 7,795	440–1,715	1,210–2,720	266–598		
1979	2,426– 3,816	534– 839	1,481–3,155	326–694		
1981	3,255–12,830	618–2,438	2,205–4,645	419–883		
Indonesia						
1972	200	0.49	200	0.49	200	0.49
1974					5,000[4]	12.00
1975					7,500	18.08
1976	5,000	12.05	3,750	9.04		
1977	5,000	2.05	3,750	9.04	2,750[5]	6.63
1979	5,000	8.05	3,750	6.04	2,750	4.43
1981	5,000	7.95	3,750	5.96	2,750	4.37
Iran						
1976	50,000	700	30,000	420	10,000	140
1977	77,000	1,078	45,500	637	21,000	294

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Table 4.5. Monthly payments to family planning service personnel of all types: Selected countries and years *(continued)*

Country and year	Doctor		Nurse/Midwife		Referrer	
	Local currency	U.S. $	Local currency	U.S. $	Local currency	U.S. $
Malaysia						
1977	1,930	482.50	149	104.75		
1979	1,900–2,125	874–978	350–810	161–373	180–360	83–166
1981	1,360–2,770	612–1,247	540–1,120	243–503	300–510	135–230
Mauritius						
1977	2,500	375			400	60
1981	4,600	598	2,000	260	650[6,7]	84.50
Mexico						
1972[8]	4,500–6,500	360–520	1,600	128		
1974	5,000[8]	400	2,100[8]	168	2,300[8,9]	184
	6,240[10]	499			1,368[9,10]	109
Philippines						
1972	350–800	56–128	300–350	48–56	130	20.80
1974	700	105	300–332	45–50	130	20
1975	700	105	300–350	45–53	150	23
1976	770	107.80	330–385	46.20–53.90	150	21
1977	813	113.82	349–405	48.86–56.70	390	54.60
1979	970	135.80	631	88.34	424	59.36
1981	1,200	156	556	72.26	520	67.60
Puerto Rico						
1976	1,405	1,405	555	555		
Singapore						
1972	1,138	421	475	176	296	110
			473	175		
1974	1,406	562	468	187	540[9]	216
1975	1,731	744	1,288	554	500[7]	215
					705[9]	303
					100	43
1976	1,790	716	617–1,240	247–496	533[7]	213
					778[9]	311
1977	1,914	785	648–1,292	266–530	552[7]	226
					805[9]	330
1979	2,219	999	837–1,208	377–544	691[7]	311
1981	2,994	1,407	2,102	988	924	434

Notes

1. Payments based on 20 hours per week for doctors, 40 hours per week for nurse/midwives and referrers.
2. Ministry of Health medical supervisor per month.
3. Clinics of the Asociación Pro-Bienestar de la Familia de Guatemala (APROFAM); payment per hour.
4. Referrers were field-workers.
5. Referrers were auxiliary family planning workers.
6. Additionally, both field-workers and clinic assistants were paid 1,400 Rs (U.S. $182.00) for monthly service.
7. Family planning assistant.
8. Private clinic session per month.
9. Referrers were social workers.
10. Government program per month.

References

Nortman, 1969–76, 1978, 1980, and 1982.

for more than half of all available family planning services, sterilization scores are very low, but family planning services in general are even more limited. Conversely, in China, Hong Kong, the Republic of Korea, Singapore, and Taiwan, sterilization availability represents only about one-third of the availability score of all fertility regulation services, since other family planning methods in these countries are also easily available. In Brazil, Fiji, Indonesia, Paraguay, and Tunisia, other methods appear to be more readily accessible than sterilization.

To repeat, over 60% of couples in developing countries have reasonable access to female sterilization, but nearly 40% do not, and most lack access to vasectomy. These percentages are weighted heavily by a few large countries, especially China, the three Asian subcontinent countries (Bangladesh, India, and Pakistan), Indonesia, and Brazil. By far, most governments have not yet taken the necessary steps to fully extend services for both male and female methods to their populations, and this lack of initiative is clearly a severe constraint to wider use of this contraceptive option.

Table 4.6 Sterilization availability, by sex: Summary measure for 59 developing countries

Country	Sterilization score		Total family planning service availability score (maximum = 24)[1]	Sterilization availability as a percentage of total availability[2]
	Male	Female		
Afghanistan	0	0.5	2.0	25
Bangladesh	3.8	3.8	16.3	47
Botswana	0.5	0.5	6.8	15
Brazil	0	3.0	12.7	24
Burma	0	0.1	3.4	3
Burundi	0	0.5	1.0	50
Chile	0	0.6	10.9	6
China, People's Republic of	4.0	4.0	23.0	35
Colombia	2.5	4.0	19.6	33
Costa Rica	0.8	1.0	13.3	14
Cuba	2.0	4.0	20.0	30
Dominican Republic	0	4.0	15.0	27
Ecuador	1.0	1.0	14.3	14
El Salvador	4.0	4.0	18.0	44
Fiji	0.7	2.0	13.2	20
Gambia	0	1.0	4.0	25
Guatemala	4.0	4.0	11.4	70
Guyana	0	0.4	10.0	4
Haiti	0.2	1.5	8.2	21
Honduras	0.4	1.4	4.0	45
Hong Kong	4.0	4.0	23.5	34
India	4.0	4.0	13.9	58
Indonesia	1.0	1.6	13.6	19
Jamaica	2.7	2.7	15.0	36
Jordan	0	4.0	10.5	38
Kenya	0	0.1	4.2	2
Korea, Republic of	4.0	4.0	24.0	33
Lebanon	0	1.3	9.8	13
Malawi	0	1.0	1.1	91
Malaysia	1.8	3.0	15.0	32
Mauritania	0	0.1	1.5	7
Mexico	2.0	2.7	16.4	29
Morocco	0	0.5	8.4	6
Mozambique	0	0.5	1.8	28
Nepal	1.4	1.4	7.1	39
Nicaragua	0	1.5	6.9	22
Nigeria	0.2	0.2	3.0	13
Pakistan	0.6	0.8	8.9	16
Panama	2.0	3.5	18.3	30
Papua New Guinea	1.0	1.5	8.5	29
Paraguay	0.5	1.0	5.0	30
Peru	0	0.5	5.7	9
Philippines	1.7	2.1	15.0	25
Sierra Leone	0	0.2	2.9	7
Singapore	4.0	4.0	24.0	33
Sri Lanka	3.0	3.5	16.9	38
Taiwan	4.0	4.0	24.0	33
Tanzania	0	0.2	1.9	11
Thailand	3.0	3.0	19.5	31
Trinidad	2.0	2.0	12.8	31
Tunisia	0.1	3.5	17.5	21
Uganda	0.2	0.2	1.1	36
Venezuela	0	1.0	5.5	18
Vietnam	1.5	1.5	10.2	29
West Samoa	0	1.0	4.9	20
Yemen Arab Republic	0	1.0	1.5	67
Yemen, People's Democratic Republic of	0.5	0.5	2.1	48
Zaire	0	0.2	2.7	7
Zimbabwe	0	0.2	5.1	4

Notes

1. The total availability score (adapted from Mauldin and Lapham, 1984) was calculated as follows: About four "knowledgeable" respondents from each country were asked to estimate the percentage of couples of reproductive age who had "ready and easy access" to each family planning method. The percentage for each country was divided by 20, yielding a score from 0 to 4, with any result over 4 counted as 4. The total score was calculated for six methods, so that the total can potentially reach 24.
2. This column was calculated by dividing the sum of the availability scores for male and female sterilization by the total availability score.

5. Social Science Findings

This chapter presents a brief summary of the literature on the social and psychological aspects of voluntary sterilization, based largely upon an extensive review by William and Susan Phillíber (1983). Despite the large number of studies that have investigated the antecedents and consequences of sterilization, the amount of knowledge actually gained is disappointing. Most studies suffer from weaknesses in study design, sample selection, and methods of analysis. The majority are descriptive, making it impossible to separate out the relative importance of various factors. Studies on the consequences of voluntary sterilization often lack the necessary methodological controls to identify sterilization itself as the causal agent in perceived changes. Moreover, the literature on consequences contains much subjectivity in interpretation, as in dissimilar versions of "regret," and in how seriously various negative consequences should be regarded. In spite of these difficulties, certain conclusions can be drawn about the social and psychological correlates of sterilization.

The decision to be sterilized does not appear to be greatly affected by socioeconomic status. Voluntary sterilizations may increase as more women work outside the home in the paid labor force; but socioeconomic status, as measured by education, occupation, or income, does not seem to have a significant impact on the decision to be sterilized. Sterilizations typically occur among couples in the middle range of their childbearing years, with at least two children, often born early in marriage and in rapid succession. They rarely take place among couples who do not have a son. Except in Latin America, most couples seeking voluntary sterilization have already exceeded the number of children they want to have. Within the United States, vasectomies are much less common among nonwhites than among whites.

While there is a strong belief among many that "culture" and its attitudinal correlates can pose strong barriers to voluntary sterilization, the data do not strongly support this notion. Religion, for example, does not greatly affect the probability of sterilization. The opposition of some religious institutions to sterilization may affect its general availability, but still exercises only a minor influence on personal decisions whether to seek it. The data do point to the importance of spouse or significant others, especially for males considering sterilization, as a source both of information and of support. Every study that has analyzed marital relations also reports that people with better marital relations are more likely to seek a voluntary sterilization. As regards the influence of culture more narrowly defined, there is little firm evidence, since most information comes from surveys of individuals rather than from anthropological or cross-national comparisons. Moreover, the latter appear to point to the full provision of convenient services as the key determinant of variation in sterilization use, at least across Asia and Latin America.

Most studies on the consequences or side effects of voluntary sterilization have been retrospective in design and have focused primarily on the impact of sterilization on sexual behavior and desire; marital relations; attitudes toward family, children, and work; and the question of regret. Most acceptors of sterilization experience no change in any aspect of their sexual behavior or desire, no change in the quality of their marital relationship, and no change in work-related behavior. There is little evidence that many individuals regret having had the sterilization. It may have a positive impact on attitudes toward children, and is more likely to have a positive effect when fear of pregnancy existed prior to the procedure. The negative impacts of sterilization appear to be more common: (1) in India than in other nations, (2) among those who were pressured into having the procedure, (3) among those who did not understand the consequences of the procedure, (4) among those who have health problems after the procedure, and (5) among those with unstable marriages or spousal disagreements about the sterilization.

The Phillibers' review gives great stress to the need for more extensive research into the social science aspects of voluntary sterilization, with much better methodology than has heretofore been used.

6. SURGICAL PROCEDURES

FEMALE STERILIZATION

Female sterilization procedures were demonstrated in the late 1800s but did not become widely available until the introduction of the Pomeroy method for occluding the fallopian tubes (oviducts) in the 1930s. This technique has remained a standard, although many modifications and new techniques have been developed in an effort to improve effectiveness, safety, or reversibility. Simplified female sterilization procedures that can be done on an outpatient basis with local anesthesia have permitted the expansion of services in many countries. These procedures minimize the complications associated with general or regional (spinal or epidural) anesthesia, which have been identified as primary risk factors for female sterilization.

Almost all the currently used methods of female sterilization that are not experimental employ surgery. The many variations in female sterilization procedures can be considered under three headings: (1) approaches to reach the fallopian tubes, (2) techniques of tubal occlusion, and (3) factors governing selection of the approach and the technique of occlusion.

Approaches to Reaching the Tubes

Abdominal Approach

Minilaparotomy (minilap)

This approach makes use of an incision in the lower abdominal wall 2–5 cm (1–2 in.) long. The operation is usually made easier by the use of the uterine elevator, an instrument inserted into the uterus through the vagina. The uterine elevator is used to lift the uterus and bring it forward to the incision site, and to move it to either side in order for the operator to reach the fallopian tubes. The method is very popular and is appropriately carried out under local anesthesia with light sedation. It may also be performed under general or spinal anesthesia, although for uncomplicated procedures, local anesthesia is generally advocated (World Federation, 1984, p. 4).

The minilaparotomy technique can be performed within 72 hours of delivery (in the immediate postpartum period) via a semicircular incision in the lower rim of the navel measuring 1–2.5 cm (0.5–1 in.). The large postpartum uterus can be gently moved manually from side to side in order to expose the tubes at the incision site. Alternatively, the loose abdominal wall permits the incision to be moved to either side so that the operator may reach the tubes. (A uterine elevator is not used in the postpartum procedure.) The tubes are technically easy to locate in the postpartum period, and some surgeons are able to complete the vast majority of procedures using an incision measuring 1–1.5 cm, local anesthesia and gentle technique without the addition of sedation or analgesia. This permits women to be discharged without any additional hospital stay, a special advantage at maternity hospitals where delivery facilities are crowded and early discharge is necessary (Fernández Diloné, 1983, p. 3).

Laparotomy

Conventional laparotomy requires an incision that is larger than 5 cm (2 in.), and the procedure is usually carried out under general anesthesia. Obese women may require a larger incision, as may those who have had pelvic disease or previous pelvic surgery. For interval sterilization (at least six weeks after delivery), the incision, either transverse or vertical, is made in the lower abdominal wall. For a postpartum laparotomy the incision should be at or near the navel. Laparotomy incisions may prolong recovery time and are often less attractive than minilap incisions when healed.

Closed Laparoscopy

The laparoscope, essentially a telescope combined with a light, is inserted into the abdominal cavity for purposes of viewing the abdominal organs. It can also be used to occlude the tubes and to perform certain other surgical procedures. The design of some laparoscopes permits operating instruments to be inserted through them to enter the abdomen; if such a laparoscope is used, one incision is sufficient. Otherwise, a second puncture is needed for ancillary instruments to manipulate organs or occlude the tubes. To begin the procedure, a very small incision is made just below the umbilicus. The abdomen is insufflated with approximately 1–3.5 liters of carbon dioxide, nitrous oxide or room air through a needle inserted into the incision. The incision is then expanded to approximately 1 cm, and a sharp trocar with its cannula (sleeve) is pushed through the abdominal wall into the abdominal cavity. The trocar is removed and the laparoscope passed through the cannula to permit the pelvic organs to be viewed and the tubes occluded. When a second puncture is needed, it is usually made in the lower abdomen.

A uterine elevator (similar to that used with minilaparotomy) is often employed to move the uterus in order for the fallopian tubes to be identified and grasped.

The laparoscopic approach can be used with general or local anesthesia. The equipment is sophisticated and its use by inexperienced practitioners can cause complications; therefore, the operator must have specialized training not only in obstetrics and gynecology or general surgery, but in laparoscopy as well. The procedure is generally not recommended for women who have severe heart or lung disease. Previous abdominal surgery or pelvic infection are considered relative contraindications by some.

Serious complications, which are rare when the operator is well trained and experienced, may include entry of gas into the vascular system or some other structure, or trauma resulting from the insertion of either the needle or the sharp

trocar. A burn injury to other structures can occur when electrocoagulation is used to occlude the tubes.

Closed laparoscopy can be performed relatively quickly, and it does not leave a large scar.

Open Laparoscopy

In an attempt to minimize the risk of intra-abdominal injury caused by the insufflating needle or the sharp trocar, a variation of the laparoscopy procedure has been developed. Open laparoscopy combines some of the features of minilaparotomy and some of closed laparoscopy. The abdomen is opened vertically through the lower rim of the navel with a small incision. A special cannula with a blunt obturator is inserted under direct vision. The incisional edges are sutured and tied to the cannula, forming an airtight seal. Gas is insufflated through the cannula, and the obturator is removed and replaced by a standard laparoscope. The remainder of the procedure is similar to that with closed laparoscopy. Unlike closed laparoscopy, this procedure generally calls for the fascial layer to be sutured upon completion. The procedure may require more time than closed laparoscopy, but it is considered inherently safer in out-of-hospital settings, where surgical complications may be difficult to manage (Hasson, 1984, p. 4). Reducing the chances of hemorrhage, of the entry of gas into a blood vessel, and of injury to other organs becomes more important for surgery outside a hospital setting.

Vaginal Approach

With colpotomy or culdoscopy, the tubes are reached through an incision made high in the vagina posterior to the cervix. Colpotomy employs the lithotomy position and standard surgical techniques; culdoscopy uses a specialized instrument similar to the laparoscope to view the tubes while the patient is in the knee-chest position. In both of these techniques the tubes are drawn down into the vagina, where the occlusive procedure is performed. No visible scar results after either technique. These procedures have been used less in recent years because of the increased risk of pelvic infection.

Transcervical Approach

The most widely relied on transcervical approach to the fallopian tubes is utilized in the People's Republic of China. It involves the insertion of a fine polyethylene catheter into the tubal opening from the uterine cavity, through which 0.1 cc of a compound (phenol in a radiopaque thick carrier media) is instilled into each fallopian tube. A metal cannula, which can be bent at an angle to fit the curvature of the uterine cavity, is inserted into the uterus through the cervical canal to facilitate passing the polyethylene tube. Because the manipulations are no more uncomfortable than those involved with inserting an IUD, this procedure can be performed without anesthesia. A simple X ray of the abdomen determines the extent of filling with the compound. The Chinese report success in filling more than 2 cm of the tube on each side in over 90% of women. The procedure takes approximately 10 minutes and is performed by either doctors or paramedics. Side effects are reportedly low. It is not known what the experience will be with this approach outside China.

In other parts of the world, methylcyanoacrylate (MCA) and quinacrine have been used to occlude the tubes, having an effect similar to that of phenol. MCA is forced into the tubes by a balloon-like device that expands inside the uterus once the liquid MCA is released into the cavity. Quinacrine has been delivered into the uterine cavity by a variety of means. The two most recently tested are the insertion of quinacrine pellets and the use of an intrauterine device with the material molded on the arms. Neither method forces quinacrine directly into the tubal openings. MCA and quinacrine are still in the experimental stage and have required more than one application to successfully close both tubes for more than 80% of women. However, if future developments show these two compounds to be highly effective, they will be easy to adopt (Kleinman, 1982, p. 30).

Another transcervical method is the instillation into the tubes of a liquid silicone material that solidifies to form a flexible plug, or cast, throughout the length of the fallopian tube. A hysteroscope is required for this technique; this optical instrument is passed through the cervical canal into the uterine cavity. The operator can view the opening of each tube through the scope and then place an obturator into the tube. The liquid silicone material is instilled and left to harden, which takes about six minutes. This technique requires expensive instrumentation and special training in use of the hysteroscope and in the technical preparation of the silicone material. Approximately 15% of women cannot be successfully fitted with the silicone plugs, and the method is still in the testing stages in the United States (Wimberley, 1982, p. 3).

A special instrument has been inserted through the hysteroscope to cauterize the opening of the fallopian tube with heat or by freezing. Success rates for these techniques have been low, and because they require a great deal of skill, serious complications have been reported; cautery through the hysteroscope is, therefore, not presently recommended (Kleinman, 1982, p. 26).

Techniques of Tubal Occlusion

Ligation or Resection

The Pomeroy procedure involves tying off a loop of each tube with absorbable suture and cutting off the top of the loop near the tie. In the Madlener procedure, the tubes are crushed and then ligated with nonabsorbable suture. This technique carries a higher failure rate than the Pomeroy and is no longer widely used. The Irving procedure entails ligation and division of the tubes, and burial of the uterine end of the tube within the uterine muscle and the ovarian end between the leaves of the broad ligament. This method is technically more demanding and requires a larger incision, but it may carry a lower pregnancy rate (WHO, 1980, p. 11).

Fimbriectomy (or the Kroener technique) involves resection of the fimbriated end of the tube. It is effective but essentially irreversible because the fimbria are important for transport. It is also associated with the possible collection of fluid within the rest of the tube, a complication that may require surgical correction. For these reasons, it is generally not recommended (Kleinman, 1982, p. 28).

Salpingectomy, which requires a more extensive surgery, is complete removal of the tube.

Another approach has been to leave the tubes intact but to bury the fimbrial ends in the broad ligaments. This method was proposed to improve reversibility, but this effect has yet to be adequately assessed. The failure rate associated with this method is relatively high because the edges of the incision in the broad ligament may not heal and the fimbriated ends may be restored to a natural position (Kleinman, 1982, p. 28).

Electrical Methods

Coagulation (sometimes called cautery) of the tubes can be achieved by high-frequency electrical current; this method is usually performed through a laparoscope Unipolar coagulation (which was the first type developed) involves passage of electrical current through the tube, and the patient, to a ground plate. Because of risks of burns to the bowel, bladder, and abdominal wall, bipolar coagulation was developed. In this electrocoagulation method, the current passes only between the two jaws of the grasping instrument, thereby coagulating only the tissue that is grasped. Bipolar coagulation does not require that the current pass through the patient, and it reduces the risks of injury to other organs.

Mechanical Occlusion Devices

A Silastic band (Falope-Ring) can be applied by laparoscopy to occlude a loop of the tube, working, in principle, similarly to the Pomeroy procedure. This procedure has been associated with more postoperative discomfort than Pomeroy ligation or electrocoagulation, although the ring avoids the risks that electrocoagulation presents. The ring may be difficult to apply if the tube is enlarged or has been previously infected (Kleinman, 1982, p. 29).

Several types of occlusive clips have been developed for application through the laparoscope, and some also through a minilap incision. One clip is applied to the narrow isthmic portion of each tube. An advantage is that only 3–4 mm of the tube are destroyed, considerably less than the 2–3 cm with the Pomeroy technique or the Silastic band. Coagulation techniques may destroy much more. Thus, reversals are technically simpler and more often successful.

Some failures with clips have been attributed to misapplication of the clip or incomplete occlusion of the tube. Consequently, specialists have changed the design of the clips over time. One of the earlier and most widely used types is the Hulka clip, a spring-loaded device that compresses and necroses about 3 mm of the tube. A newer type is the Filshie clip, a titanium clip lined with silicone rubber that has a hinge at one end and a firm clasping mechanism at the other. This clip can accommodate enlarged tubes, and its design may prevent some problems of misapplication or migration (Filshie, 1983, p. 115).

Other Procedures Resulting in Sterilization

Other procedures can render a woman sterile, although they would not be recommended primarily for contraception. Hysterectomy (removal of the uterus and, sometimes, the tubes) obviously produces sterility. This is a major surgical procedure and should be performed only to treat uterine pathology or other medical conditions.

Removal or irradiation of the ovaries secondary to therapy for malignancy can also cause sterility. This procedure is a form of castration and brings about a premature menopause. It is not offered as a primary means of contraception.

Factors Governing Selection of the Approach and Technique of Occlusion

Figure 6.1 gives an overview of the major approaches. It also identifies the techniques utilizing endoscopy (laparoscopy, culdoscopy, and hysteroscopy). Selection of the approach to the tubes, as well as of the method of occlusion, is influenced by multiple factors. For example, availability of specialized surgeons, well-equipped hospitals, and general anesthesia backup plays a major role in the provision of endoscopy services.

Minilaparotomy is appropriate for carefully selected patients who have no contraindications for surgery and for whom local anesthesia with light sedation is sufficient. It utilizes the standard Pomeroy procedure or the Falope-Ring, and more recently has included application of the Filshie clip. Minilap can be performed by nonspecialized doctors or appropriately trained and supervised paramedical personnel working in modestly equipped facilities that do not have general anesthesia backup. The instruments are also significantly less expensive and simple to maintain. Prevalence of these procedures has been expanding rapidly in urban as well as rural areas.

Tubal ligations are performed only by medically qualified doctors in most countries. However, in Thailand and some other countries, nurse-midwives and other paramedical personnel have been trained to perform tubal ligations, particularly in the postpartum period. With careful supervision and adequate training, the experience to date has been favorable (Satyapan et al., 1983, p. 118).

Laparoscopic procedures require more expensive and sophisticated instruments, special repair and maintenance centers, and specialist surgeons who have additional training in laparoscopy. Although the procedure can often be completed under local anesthesia, general anesthesia backup is recommended (World Federation, 1984, pp. 36–37). Laparoscopy is usually reserved for major hospital facilities and surgeons who perform the procedure regularly and thus maintain the requisite skill. The short duration of surgery can make laparoscopy appealing to busy service providers. Laparoscopy is also extremely useful for a variety of diagnostic purposes, such as the confirmation of ectopic pregnancy or ovarian disease.

The timing of the sterilization procedure also influences the choice of approach. In the immediate postpartum period, minilap (with the incision at the level of the navel) is the preferred approach, with the occlusion of the tubes by the standard Pomeroy technique or by Filshie clips. The Falope-Ring probably should not be used in the postpartum period because the tubes are often thick and edematous, and the potential for injury or failure is thereby increased.

Access to hospital facilities may be a secondary factor influencing the choice of postpartum procedures. This is the

only time many women will be at a facility providing surgical services. Counseling should be provided in the antenatal period, and the decision for a permanent method made well in advance of delivery whenever possible. This approach requires coordination between nurse-counselors or other health-care providers and the surgical team who provide postpartum service.

Sterilization can also be carried out during cesarean section. However, the convenience of performing tubal occlusion at this time should not be the rationale for a cesarean section, because of the increased incidence of complications. Tubal occlusion can also be performed at the time of other pelvic or abdominal surgery, or at the time of a medical termination of pregnancy (Kleinman, 1982, p. 20).

The potential for reversibility is sometimes a consideration in the choice of sterilization technique; however, the initial procedure must always be regarded by the client as a permanent method. Where the potential for reversibility is a special consideration, clips (the method with the greatest potential reversibility) may be used. The Pomeroy procedure and Falope-Ring would be second in terms of potential reversibility. The electrocoagulation methods, which may destroy a greater portion of the tube, are usually considered less reversible, and the chemical methods will probably prove to be the least reversible.

Figure 6.1. Approaches to the tubes and related occlusion techniques

Approach		Occlusion technique	
Abdominal	Minilaparotomy	Ligation*	
		Mechanical devices	Clips
			Rings
	Laparotomy (conventional)	Ligation*	
		Mechanical devices	Clips
			Rings
	Laparoscopy (open and closed)	Electrocoagulation	Unipolar
			Bipolar
		Mechanical devices	Clips
			Rings
Vaginal	Colpotomy	Ligation*	
		Mechanical devices	Clips
			Rings
	Culdoscopy	Electrocoagulation	Unipolar
			Bipolar
		Mechanical devices	Clips
			Rings
Transcervical	Hysteroscopy	Physical occlusion (plug)	
		Chemical agents	
	Intrauterine instillation	Chemical agents	

*Pomeroy, Irving, etc.

MALE STERILIZATION

Vasectomy is a simple, minor surgical procedure that usually takes 5–15 minutes to perform after 5–10 minutes for preoperative preparation and local anesthesia. One or two small incisions are made in the scrotum to isolate the vas deferens, the duct that carries sperm from the testes to the urethra. The vas is then occluded by one of several techniques.

The procedure is almost always performed under local anesthesia, which is safer and less expensive than general anesthesia. Usually 2–5 cc of 1% lidocaine (lignocaine) or a similar anesthetic injected into the skin and the sheath of the vas is sufficient anesthesia. For the few men who may need modest sedation, a small dose of tranquilizer such as diazepam may be used as a supplement. After the hair is shaved or clipped, the scrotum is cleansed thoroughly and prepared with an effective, nonirritant, water-based antiseptic. Although sterile technique and sterile surgical gloves are a necessity, many surgeons in the United States feel that cap, mask, and surgical gown are not necessary (AVS Science Committee, 1983, p. 3).

The first steps of the procedure are identifying and immobilizing the vas through the skin of the scrotum. The incision is usually 0.5–1 cm long, although some surgeons use a longer incision over the vas. The operator may make one or two incisions; the more common practice is to make two. Some experienced practitioners may prefer a single incision through which each vas is then delivered. The vas is then isolated and removed from the sheath of fibrous tissues (fascia) surrounding it. The vas is cut, and often a segment of 1 cm or less is removed. Removal of a large segment of the vas would make a reversal attempt more difficult. At this stage, some operators irrigate the urethral side of the vas to remove residual sperm; however, this practice is not widely used (Liskin et al., 1983, p. D-64).

The cut ends of the vas can be occluded in several ways.

1. *Ligation* with either absorbable or nonabsorbable sutures is one of the most widely used techniques. The ends

of the vas may be tied directly, or the vas may be doubled back on itself before being sutured. In some cases, the sheath is closed over one end (fascial interposition) to impose an additional barrier.

2. *Coagulation* of the vas lumen by a needle electrode or cautery device creates a firm scar occluding the vas. As an alternative to ligation, this method may better prevent leakage of sperm from the end of the vas. If sperm do leak from an inadequately occluded vas, a sperm granuloma can form, through which channels may develop and permit sperm to pass to the urethral portion of the vas. This is the most common mechanism of vasectomy failure.

In the coagulation method, only the inner layer of the vas is sealed closed with a decremental form of coagulation that does not burn through the muscle wall of the fine 2.5-mm-diameter vas. This method is different from the electrical method of tubal occlusion for women, whereby an entire segment of fallopian tube is coagulated.

3. *Tantalum clips* have also been applied to the vas to block the passage of sperm. Since tantalum is not absorbable, the clips remain and are sometimes palpable by the man. Investigators have found it necessary to apply several clips to each end of the vas in order to achieve high effectiveness. Theoretically, a clip method might be thought more reversible; however, experience has shown that it is not. Because the metallic clip seems to have no remarkable advantages, this method is rarely used (Liskin et al., 1983, p. D-65).

Surgeons differ in their preferences for closing skin incisions. Some have maintained that for incisions smaller than 1 cm, skin sutures are not required and would in fact increase the chance of injuring blood vessels and causing a hematoma in the scrotum (AVS Science Committee, 1983). Other surgeons suture all vasectomy incisions.

After vasectomy, a man remains fertile until the sperm stored in the seminal vesicles are removed through ejaculation or become inactive with time. All acceptors should be informed that 15 ejaculations must occur or six weeks must elapse before they can be considered sterile. In many programs, men are given a supply of condoms to use for the first 15 ejaculations. After this, the man may have his semen examined to ensure that the vasectomy was successful and that no sperm are present in the ejaculate (Liskin et al., 1983, p. D-65; AVS Science Committee, 1983).

Modifications have been made in vasectomy procedures to improve effectiveness, reduce complications, or increase the potential for reversal. Experimental methods of occluding the vas have been attempted using percutaneous (through the skin) cautery or the injection of chemicals that will cause the vas to scar closed. Ethanol, formaldehyde, silver nitrate, MCA, phenol, and some combinations of chemical agents (e.g., ethanol and formaldehyde) have been used in various trials (Liskin et al., 1983, p. D-67). Since failure rates are usually unacceptably high, none of these methods has become widely used.

Attempts have been made to place devices in the vas that can later be removed or opened to allow sperm to pass. These efforts to make vasectomy more reversible have generally not met with success. There have been several problems with the devices; for example, the surgery has been difficult, and the devices have not consistently stayed in place within the muscular vas.

7. MORTALITY

Mortality information for voluntary sterilization comes from varied sources. Some analyses have combined hospital discharge data with special assessments of each fatality (Peterson et al., 1982). Others have included prospective reviews of mortality (Chamberlain and Brown, 1978; Rosenberg et al., 1982; ICMR, 1982) or have relied on national reporting systems, sometimes combined with special retrospective assessments of mortality (Grimes et al., 1982a, 1982b; Grimes and Peterson, 1980; Bhuyan, 1983). The Association for Voluntary Sterilization has a required reporting system for deaths associated with sterilization (Huber and Gall, 1983; Rahman and Jezowski, 1983). Numerous approaches for collection of information have been devised, in part because of the difficulty in obtaining accurate reporting and the special concern about the safety of voluntary sterilization.

The data in Table 7.1 have been selected to represent several multinational and national studies. While the completeness of reporting is not assessed, the type of data collection system is described in the notes. In general, the prospective studies and those employing several techniques to identify deaths can be expected to have more complete reporting than long-term, ongoing data collection systems, which tend to rely on more passive reporting techniques. Wide confidence limits around the mortality rates are expected, given the small number of deaths in each study. This feature limits the utility of any comparison of rates, except when the differences are very large.

FEMALE STERILIZATION

The rationale for female sterilization has been based on health concerns for a long time, but such concerns may have become a more compelling argument in recent years as techniques have simplified and deaths have become less frequent. An early study of 1,830 postpartum female sterilizations from 1936 to 1950 at a hospital in the United States reported a mortality rate of 300 per 100,000 procedures. The authors noted that this rate was similar to that associated with childbirth in general and, therefore, they concluded that voluntary sterilization could not be justified on the grounds of multiparity alone (Prystowsky and Eastman, 1955). By contrast, in 1982, a report from India noted very favorable health benefits of female sterilization by minilap in the postpartum period. It found one death among 14,073 procedures, or a rate of seven deaths per 100,000 procedures, as compared with maternal mortality of 420 deaths per 100,000 live births for India as a whole (ICMR, 1982, p. 45). In a 1979 Bangladesh study reporting 19 deaths per 100,000 female sterilizations, it was estimated that 100,000 voluntary sterilizations would prevent 1,015 maternal deaths, a very favorable health impact (Grimes et al., 1982b, p. 149). It follows that in countries with lower maternal mortality, the health impact, based on mortality, would be somewhat less favorable.

Mortality associated with female sterilization has varied considerably in relation to anesthesia technique. Of 29 female sterilization deaths identified in the United States from 1977 to 1981, 11 followed complications of general anesthesia. Seven others were due to sepsis, and four were related to hemorrhage. The seven other deaths were from a variety of causes (Peterson et al., 1983, p. 131). AVS reports 23 deaths related to minilaparotomy in overseas programs that it supported from 1973 to 1983. Fourteen of these were related to anesthesia. Oversedation with opiod drugs was the most common cause of mortality. General anesthesia also contributed, and four fatalities in Latin American countries were related to spinal anesthesia (Huber and Gall, 1983). Recent Indian experience also identifies general anesthesia and spinal anesthesia with fatalities and serious, life-threatening complications (ICMR, 1982, p. 44). By contrast, the number of life-threatening complications related to the use of local anesthesia was considerably less (see chapter 8, page 41). The decline in mortality in Bangladesh from the periods January 1979–March 1980 and July 1979–June 1980 to the period December 1980–June 1983 (Table 7.1) was accompanied by an emphasis on lower doses of narcotic analgesia, greater reliance on the use of local anesthesia, and monitoring of vital signs during and after surgery (Rahman and Jezowski, 1983, p. 6). However, data from the earlier periods are based on the national program, while the data in the later period are from the Bangladesh AVS. The emphasis on local anesthesia with light sedation has received wide approval by members of the World Federation of Health Agencies for the Advancement of Voluntary Surgical Contraception (World Federation, 1984, p. 30).

With the laparoscopic technique, fatalities in addition to those associated with anesthesia can also occur from insufflation of gas into the peritoneal cavity, hemorrhage, and, when electrocoagulation is used, thermal injury of the intestine. It has been estimated that cardiac arrest is experienced in as many as one in 2,000 procedures, and that there is one death per 8,000 procedures. The incidence of serious cardiac arrythmias can be reduced by proper anesthesia and insufflation techniques (Fishburne, 1978, p. 37).

A French review of 99,204 laparoscopies (both diagnostic and sterilization) over a 20-year period reported 20 fatalities, of which 16 were due to cardiorespiratory accidents and four were related to abdominal injuries or burns (yielding a mortality rate of 20 per 100,000 procedures). Of the total of 54 cardiorespiratory accidents, the author noted that 26 occurred during insufflation of the abdomen. Another eight of the deaths occurred during induction of anesthesia, and 15 occurred during or immediately after laparoscopy (Mintz, 1977, p. 269).

Table 7.1. Mortality attributed to voluntary sterilization for men and women: Selected areas and years

Area and year	Number of voluntary sterilizations	Number of deaths	Deaths per 100,000 voluntary sterilizations	95% confidence interval
Bangladesh				
Female sterilization				
Jan. 1979–Mar. 1980[1]	108,875	21	19	12–29
July 1979–June 1980[2]	5,042	5	99	32–230
Sept. 1980–Apr. 1981[3]	138,745	19	14	8–21
Dec. 1980–June 1983[4,5]	100,000	2	2	0–7
Vasectomy				
Jan. 1979–Mar. 1980[6]	22,526	7	31	13–64
Sept. 1980–Apr. 1981[7]	14,287	0	0	0–26
Apr. 1981–July 1983[8]	170,000	5	3	1–7
Great Britain				
Female sterilization				
Apr. 1976–Mar. 1977[9]	29,661	3	10	2–30
India				
Female sterilization				
Sept. 1976–June 1978[10]				
Minilaparotomy Postpartum	14,073	1	7	0–40
Minilaparotomy Interval	2,840	0	0	0–130
Laparotomy with hysterotomy	3,468	2	60	7–210
Laparoscopy	2,290	0	0	0–160
Colpotomy	2,192	1	50	1–250
United States				
Female sterilization				
1977–78[11]	414,513	15	3.6	1.7–6.9
AVS-International Programs[12]				
Female sterilization				
Minilaparotomy				
1973	157	0	0	—
1974	1,708	1	58	2–330
1975	5,146	0	0	0–72
1976	12,009	0	0	0–31
1977	16,545	1	6	0–34
1978	23,167	0	0	0–16
1979	28,996	9	31	14–59
1980	40,948	4	10	3–25
1981	59,973	3	5	1–15
1982	73,789	2	3	0–10
1983	106,272	3	3	1–14
1973–83	340,024	23	6.8	4.3–10
AVS-International Programs[12] *(continued)*				
Laparoscopy				
1973	734	0	0	—
1974	8,677	0	0	0–43
1975	10,489	0	0	0–35
1976	13,217	2	15	2–55
1977	13,038	3	23	5–67
1978	16,918	0	0	0–22
1979	25,615	1	4	0–22
1980	28,854	2	7	1–25
1981	37,231	4	11	3–28
1982	50,548	1	2	0–11
1983	76,177	1	1	0–9
1973–83	281,498	14	4.9	2.9–8.8
Other methods				
1973–83	99,537	1	1	0–6
All female methods				
1973–83	705,418	38	5.4	3.8–7.4
Vasectomy				
1973–83	162,572	2	1	0–3

Notes and References

1. Grimes et al., 1982b. Review of sterilization-attributable deaths in two of the four divisions in Bangladesh.
2. Rosenberg et al., 1982. Prospective study; 41 government and private centers. Causes of death: four oversedation, one aspiration pneumonia.
3. Grimes et al., 1982a. National review of sterilization-attributable deaths in Bangladesh.
4. Rahman and Jezowski, 1983. Twenty-five clinics reporting in Bangladesh AVS system.
5. Huber and Gall, 1983. Causes of death: one anesthesia, one tetanus.
6. Grimes et al., 1982b. Review of sterilization-attributable deaths in two of the four divisions in Bangladesh. Scrotal infection other than tetanus associated with all deaths; gloves commonly not worn.
7. Grimes et al., 1982a. National review of all sterilization-attributable deaths in Bangladesh. Improved aseptic technique, including use of sterile gloves, as recommended in July 1980 (Grimes and Peterson, 1980).
8. Bhuyan, 1983. Nationally reported complications for Bangladesh.
9. Chamberlain and Brown, 1978. Twelve-month prospective survey of laparoscopic procedures.
10. ICMR, 1982. Prospective study with 13 participating teaching hospitals.
11. Peterson et al., 1982. Estimated deaths occurring only during hospitalization for female sterilization procedure. Nine reviewed deaths attributable to sterilization and six unreviewed deaths assumed to be attributable to sterilization. Confidence interval estimated on basis of nine deaths.
12. Huber and Gall, 1983. Number of countries varies: five in 1973, 25 in 1978, and 24 in 1982; represent Latin America, Africa, Middle East, and Asia. Number of voluntary sterilizations for 1983 estimated on the basis of reports from first three quarters.

Because of the apparent increased risk with unipolar electrocoagulation devices, there has been an emphasis on shifting to more controlled bipolar electrocoagulation equipment in the United States (Peterson et al., 1983). In many other countries, electrocoagulation techniques have been avoided completely.

Fatalities occurring when female sterilization is performed in association with other surgery have also been a concern. The excessive rate of 460 deaths per 100,000 procedures for tubal occlusions in combination with cesarean sections in India may also reflect risks associated with the pregnancies and the cesarean sections themselves. The mortality rate associated with tubal ligation by laparotomy with hysterotomy (for medical termination of pregnancy) is 60 deaths per 100,000 procedures. The major portion of the risk is presumably related to the hysterotomy, not the tubal occlusion. The same tubal occlusion techniques without hysterotomy had considerably lower mortality rates (none and seven per 100,000 procedures for interval and postpartum minilaparotomy, respectively) (ICMR, 1982, p. 45).

High complication rates and resulting fatalities associated with culdoscopy and colpotomy have reduced interest in these vaginal approaches for female sterilization. One investigator has reported 12 deaths in 29,000 vaginal procedures performed by the Family Planning Association of India (resulting in a mortality rate of 41 per 100,000) (Motashaw and Dastur, 1983, p. 44).

In the postpartum period, the emphasis is on minilaparotomy rather than laparoscopy because of concerns about increased risk of trauma and bleeding. Immediately after delivery, the uterus fills the lower abdominal cavity, thereby contraindicating insertion of the sharp trocar and the laparoscope (World Federation, 1984, p. 21).

The completeness of case reporting in the various series available is difficult to assess. Although AVS has a mandatory reporting requirement for fatalities in its supported international programs, complete reporting still cannot be ensured. Some fatalities have been reported only several weeks or months after the event, and not always by the project director involved. In the United States, data on hospital-based fatalities (Peterson et al., 1982) related only to deaths occurring during the hospitalization at the time of the sterilization. Bangladesh fatalities have been reported on the basis of an active surveillance system wherein the government compensates the family of the deceased. This system has presumably improved reporting, but it may not guarantee completeness.

MALE STERILIZATION

Vasectomy mortality has generally been very low, but there have been some exceptions. Bangladesh fatalities in 1979 and 1980 (resulting in a mortality rate of 31 per 100,000 in the national program) were associated with a period when sterile surgical gloves were not used and aseptic technique was not rigorously followed. Infection and sepsis were the cause of most deaths. After recommendations to improve aseptic technique were implemented in 1980, the mortality rate in the Bangladesh national program dropped during 1981-1983 (Grimes et al., 1982a, p. 152; Bhuyan, 1983). AVS has recorded only two vasectomy fatalities in over 160,000 procedures performed in the international programs it has supported (Huber and Gall, 1983).

In the United States, where vasectomy is usually performed on an outpatient basis or as an office procedure, no vasectomy fatalities have been reported to the Centers for Disease Control (Liskin et al., 1983, p. D-70). However, there has been no systematic effort to identify vasectomy deaths in the United States. The practice of asepsis in the United States is to use sterile gloves, careful surgical cleansing of the scrotum, and aseptic technique (AVS Science Committee, 1983, p. 3).

8. Complications, Effectiveness and Reversibility

FEMALE STERILIZATION
Complications

Complication rates for female surgical contraception may vary by definition of complications, by classification of major and minor complications, and by completeness and accuracy of reporting. Such factors make the comparison of complication rates difficult. As regards definitions, a recently published manual of standard terms for voluntary sterilization defines a major complication as a problem that "requires intervention and management, including unintended surgery, unexpected hospitalization, blood transfusion, or treatment of life-threatening events, or that results in death" (World Federation, 1983, item no. 6.2.1). A minor complication is a problem that "requires intervention and management but not unintended surgery, unexpected hospitalization, blood transfusion, or treatment of life-threatening events, and that does not result in death" (World Federation, 1983, item no. 6.2.2). However, many studies have used definitions that do not conform to these criteria.

Clearly, safety varies with surgical approach, timing of surgery, and method of occluding the tubes; but it is difficult to separate the effects of these several factors. Only one comparative study has employed a randomized prospective design (WHO, 1982b). Because other large-scale, multicenter comparative trials have, for practical reasons, not randomized surgical procedures, however, numerous confounding factors, such as the differences among centers, cannot be controlled for.

Complication rates will also be influenced by the sophistication of the center and the expertise of the surgeons. These factors need to be considered when the inherent safety of different techniques is assessed, since some approaches (such as laparoscopy) are more likely to be performed by highly trained specialists than are other approaches (such as minilaparotomy).

The multicenter, multinational randomized study just mentioned, by the World Health Organization, compared complications of minilaparotomy and laparoscopy among 1,610 women almost equally divided between the two categories. (Approximately twice as many women were sought for recruitment into the study, and the difficulty of recruitment helps explain the paucity of such studies.) The rate of major complications was 1.5% for the women who had undergone minilaparotomy and 0.9% for the laparoscopy group. Technical problems or major anesthesia complications occurred in 0.5% of minilaparotomy and 0.9% of laparoscopy cases. Minor complications and minor complaints were somewhat higher for the minilaparotomy group. The investigators concluded that complication rates were similar for the two approaches. Because minilaparotomy has simpler requirements in terms of equipment and training, it is the preferred approach for services outside major institutions (WHO, 1982b).

A larger study comparing minilaparotomy and laparoscopy on the basis of data from 23 countries (15,000 women) reported a surgical complication rate of 2.0% for laparoscopy (tubal ring) among 6,976 women. This was more than twice as high as the 0.8% complication rate for 4,965 women undergoing minilap Pomeroy procedures, and higher than the 1.5% for 2,969 women in the minilap (tubal ring) group (Mumford et al., 1980). These investigators concluded that minilaparotomy had advantages regarding safety and ease in dealing with complications and, therefore, that minilaparotomy was the most appropriate approach for nonspecialists outside large, well-equipped hospitals.

A multicenter study of postpartum sterilization reported a major complication rate of 0.3% and a minor complication and complaint rate of 4.2% (Table 8.1). The conclusion was that postpartum minilaparotomy could be simply and rapidly performed under local or regional anesthesia. However, regional (spinal or epidural) anesthesia was not tested on sufficient cases to allow detection of certain infrequent but potentially serious complications associated with the anesthesia method (WHO, 1982a).

Another comparative trial assessed the safety of minilaparotomy compared with that of culdoscopy. Although the numbers in the two groups were relatively small (Table 8.1), the complication rates for culdoscopy were sufficiently high to lead to the conclusion that the vaginal approach could not be recommended except for surgeons experienced in vaginal surgery and that culdoscopy was less suitable for the needs of national programs (WHO, 1982c).

A large multicenter study conducted in India reported a major complication rate of 0.3% for postpartum minilaparotomy, similar to that of the WHO multinational study (Table 8.1). Major complication rates were similarly low for minilaparotomy performed concurrently with a medical termination of pregnancy (MTP) or as an interval procedure (six weeks or more after delivery). Laparoscopy had somewhat higher complication rates in this series for postpartum procedures as well as when performed concurrently with an MTP or as an interval procedure. Interval colpotomy had the highest complication rate. The difference between complication rates for colpotomy performed as an interval procedure and concurrently with an MTP is not readily explained. Laparoscopy and colpotomy were performed at relatively few of the 13 centers in this study. One of the conclusions was that postpartum minilaparotomy could be performed safely under local anesthesia (ICMR, 1982).

This study also assessed a variety of complications related to anesthesia (Table 8.2). The interpretation of the results is limited by the fact that some of the more complicated procedures, particularly tubal occlusion performed concurrently with a cesarean section or hysterotomy, could not be separated from interval and postpartum cases for each type of anesthesia. However, the differences in rates suggest that local anesthesia is relatively free of serious cardiopulmonary complications and neurologic sequelae. Spinal anesthesia was associated with the highest incidence of neurologic sequelae, primarily neck rigidity and partial paralysis (ICMR, 1982).

A U.S. study of complications for interval female sterilization by laparotomy also identified general anesthesia as a major risk factor (Figure 8.1). Additional risk factors included diabetes mellitus, previous abdominal or pelvic surgery, lung disease, history of pelvic inflammatory disease (PID), and obesity. This study found larger incisions (7 cm or longer) to be associated with a threefold greater relative risk of complications (95% confidence interval for relative risk, 1.1–8.5). This increase was not appreciably changed when other risk factors were controlled for (Layde et al., 1983).

Another study of outpatient minilaparotomy services for high-risk women with preexisting medical conditions reported no serious complications or readmissions to the hospital. In this group of 800 women, 72% were obese and 32% had other medical conditions that increased the surgical risk. These procedures were done with incisions 2–3.5 cm long and an average operating time of 9.5 minutes. Outpatient minilaparotomy, even for this group of relatively high-risk women, was considered safe when performed with local anesthesia, refined surgical technique, and emergency backup facilities for managing problems (Domenzain et al., 1982).

Table 8.1. Sterilization complication rates, by approach and timing

Approach, timing, and study center	Total subjects	Major complications		Minor complications and complaints		Reference
		No.	%	No.	%	
Multinational study[1]						
Postpartum mini-incision	1,026	3	0.3[2]	43	4.2[3,4]	WHO, 1982a, p. 501
WHO, Geneva						
Minilaparatomy	196	0	0[5]	7	3.6[3,6]	WHO, 1982c, p. 591
Culdoscopy	199	6	3.0	3	1.5	
India						
Minilaparotomy						ICMR, 1982, pp. 36–38, 51–52
Postpartum	14,072	36	0.3[7]	—	—	
Concurrent MTP[8]	3,861	23	0.6	—	—	
Interval	2,824	12	0.4	—	—	
Laparoscopy						
Postpartum	222	5	2.3	—	—	
Concurrent MTP	630	9	1.4	—	—	
Interval	1,391	16	1.2	—	—	
Colpotomy						
Concurrent MTP	1,563	18	1.2	—	—	
Interval	633	36	5.7	—	—	

Notes

1. These figures reflect the sum total of study centers in Bangkok, Chandigarh, Havana, Manila, Santiago, Singapore, and Sydney.
2. Major complications included the following: abandonment of surgery for any reason; excessive bleeding requiring either replacement therapy, additional surgery, or both; damage to the uterus or to any other organ requiring additional surgery; anesthesia complications that were potentially life-threatening; wound problems requiring hospitalization and additional surgery; and pelvic inflammatory disease requiring extension of hospital stay or readmission to hospital.
3. Minor complications included the following: minor change in surgical approach, such as enlargement of the incision; blood loss during the procedure of 50 ml or more that did not require replacement therapy or additional surgery; injury to any part of the uterus or other organ not requiring additional surgery; pelvic inflammatory disease treated with antibiotics but without hospitalization; and urinary tract infections confirmed by urine examination.
4. Complaints included a miscellany of symptoms, some with a clear relationship to the procedure or anesthesia—such as headache, abdominal pain, nausea, and vomiting—and others with a less clear relationship. All reported symptoms have been included in the analysis.
5. Same as note 2, with addition of the following major complication category: major change of surgical approach, such as vaginal approach changed to laparotomy.
6. Complaints, i.e. symptoms, were those that occurred frequently and were clearly related to the procedure or anesthesia, such as headache, abdominal pain, nausea, and vomiting.
7. Major complications include surgical injuries due to voluntary surgical contraception procedure and infection during initial hospitalization (urinary tract infections, septicemia, pelvic infection, and peritonitis).
8. Medical termination of pregnancy.

Complications following laparoscopy may include difficulties during the insufflation of gas into the peritoneal cavity (e.g., gas entering the abdominal wall or the circulation). One U.S. survey reported complications related to gas insufflation in 0.7% of cases (Phillips et al., 1975). Cardiac arrests have been reported in the literature only infrequently; however, 4.8% of American laparoscopists participating in the survey had reported this problem, and significant cardiac arrhythmias were observed by 39% of the surgeons in one study (Loffer and Pent, 1977, p. 243). Infections following laparoscopy procedures have generally been infrequent in the United States. PID and pelvic abscesses are reported in the United States more often than are skin infections (Loffer and Pent, 1977, p. 244).

Open laparoscopy is a recent innovation designed to reduce the risks related to the introduction of sharp insufflating needles and trocars (see chapter 6, page 34). One large international study has reported a lower rate of surgical complications and injuries for open laparoscopy than for closed laparoscopy procedures. This study also found that surgical difficulty was lower with open laparoscopy. However, the overall rates for the different approaches and different occlusion methods tested were considered generally comparable. Differences in techniques were felt to be less important than the experience of individual surgeons, which could potentially compensate for inherent safety differences between techniques (Bhiwandiwala et al., 1982).

Trials have been conducted in some countries using nurse-midwives to perform postpartum surgical contraception. In Thailand, 20 nurse-midwives with more than one year's experience as operating-theater assistants were trained to perform postpartum minilaparotomies. These nurse-midwives reported 97.3% of their 3,454 procedures to be routine; another 2.2% were moderately difficult; and 0.5% were so difficult as to require a doctor's assistance. These rates were acceptable for rural Thailand; however, it was difficult to compare the complication rates between nurse-midwives and physicians. Many of these nurse-midwives were supervised by obstetrician-gynecologists, 97% of whom thought the nurse-midwife's performance was satisfactory or excellent and urged expansion of this program (Satyapan et al., 1983).

Table 8.2. Anesthesia-related complications by type of anesthesia used

Type of anesthesia	No. of women	Anesthesia complications[1]									
		Cardio-pulmonary		Neurologic sequelae		Respiratory infections/ allergy		Vomiting		Total	
		No.	%	No.	%	No.	%	No.	%	No.	%
Local	10,155	2	0.02	1	0.01	6	0.06	54	0.53	63	0.62
Spinal	12,402	13	0.11	12	0.10	4	0.03	92	0.74	121	0.98
General	9,427	21	0.22	0	0	8	0.09	234	2.48	263	2.79
Other[2]	193	1	0.52	0	0	2	1.04	8	4.15	11	5.70

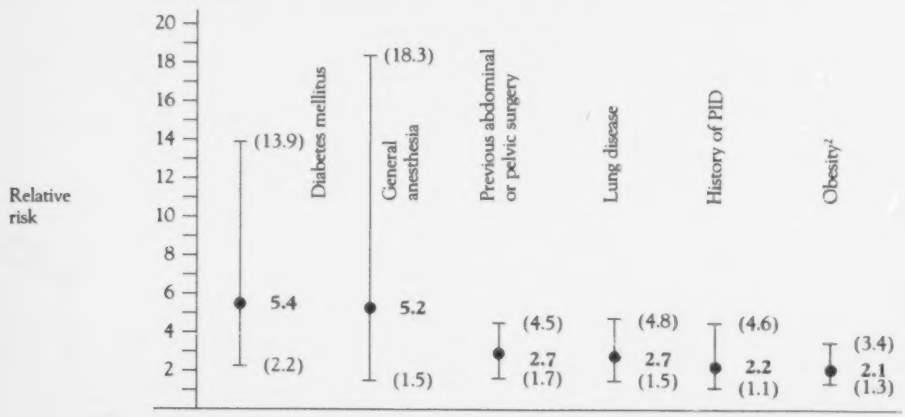
Notes

1. Anesthesia complications not subclassified by concurrent procedures or timing. Concurrent procedures included cesarean section, hysterotomy, and medical termination of pregnancy.
2. Epidural and ketamine.

Reference

ICMR, 1982, pp. 41–42.

Figure 8.1. Relative risk (with 95% confidence interval) of developing one or more complications, for various preoperatively identifiable risk factors[1]



Notes

1. Data from nine U.S. hospitals, 1978–1981.
2. ≥120% of ideal body weight.

Reference

Layde et al., 1983.

Long-Term Sequelae of Female Sterilization

Recent studies of menstrual patterns following tubal occlusion have successfully controlled for several confounding factors, including the type of contraceptive method the woman was using before surgery and her previous menstrual patterns. In a series of over 10,000 women undergoing sterilization by electrocoagulation, tubal ring, and spring-loaded clips, there were no net menstrual changes following tubal occlusion at one-year follow-up. The number of women experiencing heavier and longer menstruation was generally balanced by the number having lighter and shorter periods of menstruation. For women using the pill or IUD up to the time of the procedure, 15–79% of the menstrual pattern changes, depending on the parameter, could be attributed to discontinuation of these methods after sterilization. There were also no significant differences between the several occlusion techniques with regard to changes in menstrual patterns (Bhiwandiwala et al., 1982). Other carefully designed studies in the United States (DeStefano et al., 1983b) and the United Kingdom (Vessey et al., 1983) have confirmed the general lack of effect on menstrual patterns, but only the latter has examined menstrual function more than two years following sterilization.

Effectiveness

Failure rates for female sterilization have ranged widely. Because much of the research dealing with effectiveness has not employed the life-table method, comparisons have been difficult. Moreover, the technical expertise of the surgeons and the precise method of occlusion are often not clear. For example, crude failure rates (pregnancies per 100 cases, unspecified exposure interval) associated with the Pomeroy procedure are usually quoted as being low, at 0–0.4% (Wortman, 1976, p. C-77). While some investigators have reported rates of 2.5–5% when this procedure has been performed at the time of cesarean section, others have reported rates as low as one failure in 400 women having cesarean sections, or 0.2% (Wortman, 1976, p. C-77). Thus, it is often easier to set ranges for the rates than it is to give precise estimates.

Failure rates reported in this book include pregnancies attributable to failure of the methods of occlusion as well as to technical errors in performance of the surgery. Luteal phase pregnancies (those initiated before the time of tubal occlusion) are not included. In addition to the technique for occluding the tubes, the approach (minilaparotomy, laparoscopy, culdoscopy, etc.) and the timing of the procedure (interval, postabortion, and postpartum) may also be important in assessing effectiveness. Few articles in the literature have been able to address all of these variables simultaneously.

The first large study employing life-table techniques assessed pregnancy rates following female sterilization by minilaparotomy, culdoscopy, colpotomy, and laparoscopy in Singapore (CDC, 1977). The lowest 24-month pregnancy rate was observed in this study (0.3 per 100 women) following minilaparotomy using a modified Pomeroy technique for occlusion (Table 8.3). The highest rate in this series (4.5 per 100 women) was recorded for laparoscopy utilizing electrocoagulation. The vaginal approach (colpotomy) employing fimbriectomy had the second highest failure rate, 3.1 pregnancies per 100 women. The culdoscopic approach employing excision of each ampulla of the tube had a failure rate of 1.7 per 100 women.

A large series reported by Family Health International (FHI) compared the minilap approach using the ring or Pomeroy technique with laparoscopic ring occlusion (Table 8.3, FHI-I). This study found a 12-month failure rate of 0.3 per 100 women for minilap with Pomeroy technique, similar to that in the Singapore study. The minilap with ring and laparoscopy with ring series had higher failure rates, 0.5 and 0.6 per 100 (Mumford et al., 1980, p. 8).

However, another report from FHI, covering 12,218 women (Table 8.3, FHI-II), reported a slightly lower 12-month rate for electrocoagulation than for the tubal ring (0.3 and 0.5, respectively). In this series, there were no important differences between interval and postpartum procedures for electrocoagulation, the tubal ring or the spring-loaded clip (Bhiwandiwala et al., 1982, p. 325). But a third report from FHI (Table 8.3, FHI-III), which compared laparoscopic techniques in interval, postpartum, and postabortion women, found all of the laparoscopic techniques to be more effective in the interval cases (Chi et al., 1981, p. 290).

An extensive report from the Indian Council of Medical Research (ICMR) provided up to 12 months of follow-up on 11,670 women from several hospital centers in India (Table 8.3). This series found the minilap approach using the Pomeroy technique to be more effective than laparoscopy (primarily electrocoagulation) or colpotomy. In this series, the Pomeroy technique for occlusion was highly effective in the postpartum cases, with 0.1% failures (crude rate for 5,237 women having vaginal deliveries).

Reversibility

Unforeseen events, such as divorce, remarriage, death of a child, or the desire for more children, may lead a woman to seek a reversal procedure. The proportion of all sterilized women who seek reversal is small but nontrivial, and considerable research has been devoted to reversal techniques. The chances are low for successfully reversing the sterilization procedure with conventional surgery, but new advances in techniques of microsurgery offer hope for increasing the success rate.

Reversing sterilization basically involves surgically rejoining parts of the fallopian tube that were severed and occluded during the sterilization procedure. This rejoining must be done in such a way that the ova and sperm can once again move freely through the tube in opposite directions so as to meet. The tubes must also provide a nurturing environment for early development of the fertilized ovum before it moves into the uterus for implantation. Microsurgical techniques are used to reduce tissue trauma and to assure accurate dissection, realignment, and suturing. The procedures usually involve a combination of the following techniques (Henry et al., 1980, p. C-97):

- use of magnification,
- electrocoagulation to minimize bleeding,
- accurate realignment of tubal segments and placement of sutures,

- use of fine, non-tissue-reactive suture material and fine needles,
- special care to avoid leaving foreign matter, and
- constant irrigation of the operation site to keep tissues moist.

These techniques, compared with older techniques, have led to higher rates of intrauterine pregnancies and fewer ectopic pregnancies. An average live-birth rate of 56% has been reported among 560 women participating in a recent series of 18 studies. When "gentle tissue-handling" was employed without magnification, 48% of women had live births. In the absence of magnification and with conventional surgical techniques, a live-birth rate of 30% was reported for women in a recent series of 10 studies involving 111 cases (Henry et al., 1980, p. C-100). Although the risk of ectopic pregnancy has also been reduced by use of refined techniques, the rates are still about 10 times higher than normal, with ectopics occurring in about 8% of all reported pregnancies following reversal of female sterilization (Henry et al., 1980, p. C-114).

The relatively high success rates for reversals reported above must be interpreted with caution. Many surgeons who have lower success rates may not report their results. Moreover, most experts operate only on candidates who have been carefully screened. Selection of good candidates is based on age, fertility, health, and condition of the fallopian tubes before reversal is attempted. When all of these factors are taken into consideration, "probably only about one-fifth of all women sterilized by current techniques could have their sterilizations reversed" (Henry et al., 1980, p. C-97).

Table 8.3. Voluntary sterilization failure rates by approach, method of occlusion and timing

Approach, method of occlusion and timing	No. of women	No. of failures		Crude failure rate (per 100 procedures)	12-month life-table failure rate (per 100 women)		24-month life-table failure rate (per 100 women)	
		12 mos.	24 mos.		Rate	95% confidence interval	Rate	95% confidence interval
I. Singapore								
Minilap (modified Pomeroy)	7,989	—	—	—	0.2	—	0.3	0.2–0.5
Culdoscopy	1,650	—	—	—	0.9	—	1.7	0.9–2.4
Colpotomy	314	—	—	—	0.8	—	3.1	1.8–9.2
Laparoscopy	221	—	—	—	3.6	—	4.5	1.2–6.4
II. Multinational study (FHI-I)								
Laparoscopic ring								
Interval	3,091	14	—	—	0.5	0.3–0.8	—	—
Postabortion	876	4	—	—	0.5	0–1.1	—	—
Postpartum	295	3	—	—	1.5	0–3.1	—	—
Subtotal	4,262	21	—	—	0.6	0.4–0.9	—	—
Minilap (ring)								
Interval	641	2	—	—	0.4	0–1.0	—	—
Postabortion	75	2	—	—	—	—	—	—
Postpartum	608	2	—	—	0.6	0–1.6	—	—
Subtotal	1,324	6	—	—	0.5	0–1.0	—	—
Minilap (Pomeroy)								
Interval	1,682	5	—	—	0.4	0–1.0	—	—
Postabortion	158	0	—	—	0	—	—	—
Postpartum	182	0	—	—	0	—	—	—
Subtotal	2,022	5	—	—	0.3	0–0.6	—	—
III. Multinational study (FHI-II)								
Electrocoagulation								
Interval	5,573	11	14	—	0.2	0.1–0.4	0.4	0.2–0.6
Postabortion	596	3	3	—	0.5	0–1.1	0.5	0–1.1
Postpartum	342	1	1	—	0.3	0–0.9	0.3	0–0.4
Subtotal	6,542[1]	15	18	—	0.3	0.1–0.4	0.4	0.2–0.6

Continued on next page

Table 8.3. Voluntary sterilization failure rates by approach, method of occlusion and timing *(continued)*

Approach, method of occlusion and timing	No. of women	No. of failures		Crude failure rate (per 100 procedures)	12-month life-table failure rate (per 100 women)		24-month life-table failure rate (per 100 women)	
		12 mos.	24 mos.		Rate	95% confidence interval	Rate	95% confidence interval
Tubal ring								
Interval	3,545	14	15	—	0.4	0.2–0.7	0.5	0.2–0.8
Postabortion	1,057	4	5	—	0.4	0–0.9	0.7	0–1.4
Postpartum	425	2	3	—	0.6	0–1.4	0.6	0–6.7
Subtotal	5,046[1]	21[1]	24[1]	—	0.5	0.3–0.7	0.7	0.4–0.9
Rocket clip								
Interval	595	1	1	—	0.2	0–0.6	0.2	0–0.6
Postabortion	26	0	—	—	0	—	—	—
Postpartum	9	0	—	—	0	—	—	—
Subtotal	630	1	1	—	0.2	0–0.5	0.2	0–0.5
IV. Multinational study (FHI-III)								
Electrocoagulation								
Interval	3,146	9	—	0.3	0.3	0.1–0.5	—	—
Postabortion	236	2	—	0.9	0.9	0–2.0	—	—
Postpartum	212	1	—	0.5	0.5	0–1.4	—	—
Tubal ring								
Interval	3,327	15	—	0.5	0.4	0.2–0.7	—	—
Postabortion	633	5	—	0.8	0.8	0–1.5	—	—
Postpartum	146	4	—	2.7	2.1	0–4.3	—	—
V. India[2]								
Minilap	10,141	11	—	0.1	—	—	—	—
Laparoscopy	850	5	—	0.6	—	—	—	—
Colpotomy	679	2	—	0.3	—	—	—	—
Total	11,670	18	—	0.2	—	—	—	—
Pomeroy (all approaches)	10,833	13	—	0.1	—	—	—	—
Electrocoagulation	734	4	—	0.5	—	—	—	—
Silastic Ring	116	1	—	0.9	—	—	—	—
Pomeroy (minilap and laparotomy)[3]								
Interval	1,012	1	—	0.1	—	—	—	—
Postabortion	265	1	—	0.4	—	—	—	—
Postpartum (vaginal delivery)	5,237	3	—	0.1	—	—	—	—
Postpartum (cesarean section)	651	5	—	0.8	—	—	—	—

Notes

1. Includes cases of unknown timing.
2. Crude failure rates are based on the denominator of all women who had follow-up at one month (94.3% of 12,401 women enrolled in the study). Pregnancies were identified at six follow-up visits over 24 months. However, 65% and 52% of women followed up at one month were subsequently followed up at 12 and 24 months, respectively.
3. Interval: more than 42 days after delivery or abortion. Postabortion: 42 days or less after abortion. Postpartum: 42 days or less after delivery.

References

I. CDC, 1977.
II. Mumford et al., 1980.
III. Bhiwandiwala et al., 1982; P. Feldblum, 1984.
IV. Chi et al., 1981.
V. ICMR, 1982.

The success rate of sterilization reversal also depends on the method used to produce the occlusion, the occlusion site on the tube, and the length of viable tube. If the microsurgeon must work with extensively damaged tissue, extensive scarring, or tubal ends of unequal size, the reversal is less likely to be successful. Fimbriectomy can seldom be reversed, since no surgery can restore the function of the missing fimbria (Hulka, 1978). Electrocoagulation often destroys a long segment of the tube and is usually difficult to reverse. The Silastic band and the Pomeroy ligation technique destroy 2–3 cm of the tube, and sterilizations performed by these techniques are less difficult to reverse. However, reversibility of such procedures is still suboptimal, because of the limited tissue available to reestablish tubal function. Tubal clips produce less tissue destruction (4 mm), and sterilizations achieved by use of clips have been more successfully reversed (Weisberg and Fraser, 1982, p. 363). For example, among 85 women, 87% had intrauterine pregnancies following reversal of sterilizations with the spring-loaded clip (Hulka et al., 1982, p. 927). Research on methods that do minimal damage to the tubes or avoid the need for surgical rejoining of the tubal segments may result in even greater reversibility.

Silicone plugs to block the tubes are also being studied. In this case, the data are too limited to permit any definitive statements about reversibility, but preliminary findings are not promising (Loffer, 1984b). In summary, reversal of female sterilization is still a costly and difficult procedure with varying degrees of success. Female sterilization should therefore continue to be recommended as a permanent method of contraception.

MALE STERILIZATION

Complications

Vasectomy is a minor surgical procedure, and most postoperative complications are also minor, subsiding within one or two weeks. The most frequent complaints after surgery are swelling of the scrotal tissue, bruising, and pain. More important complications, such as hematoma formation or infection, occur in fewer than 3% of cases. Some bleeding under the skin is common and usually of no consequence. Some men will experience tenderness or a dragging sensation in the scrotum for up to a week after vasectomy. A scrotal support, mild medication for pain, and local application of ice are usually sufficient treatment.

Hematoma, a collection of blood underneath the skin, is usually reported in fewer than 1% of cases; however, without careful attention to bleeding and postoperative instructions, the reported incidence may be higher. Because the loose scrotal tissue allows injured blood vessels to continue bleeding, a large hematoma can accumulate. If untreated, a large collection of blood can lead to pain and infection (Liskin et al., 1983, p. D-68). Avoiding physical activity for two days can prevent many hematomas, and patients should be carefully instructed in this regard. Additional measures to produce hemostasis may also be effective. A remarkably low incidence of hematomas has been reported in a large series in which additional pressure was applied to the scrotal incisions for 20–30 minutes following surgery (Moss, 1983).

Infection is infrequent, usually reported in fewer than 2% of cases, although in as many as 6% in some series (Liskin et al., 1983, p. D-68). Skin infections at the site of the incision and around the skin sutures are most common. Some surgeons prefer that skin sutures be avoided entirely.

Epididymitis, manifested as swelling and tenderness of the epididymis, occurs in under 1% of vasectomized men. This swelling and tenderness is attributed often to the hydrostatic pressure increase after the vas is occluded (AVS Science Committee, 1983). The tenderness may occur soon after vasectomy or as long as several months later; the symptoms usually subside within one week. In a large study conducted in the United States by the National Institutes of Health, 1.1% of men who had not been vasectomized reported symptoms of epididymitis, as compared with only 2.6% of vasectomized men. This difference occurred only within the first year after the vasectomy, and although the differences were statistically significant, the results from this study suggest that only 1.5% of men experience epididymitis in the first year as a direct result of the vasectomy. The rates of epididymitis were essentially the same after the first year for vasectomized and nonvasectomized men (Massey et al., 1983).

Sperm granulomas (small nodules containing blocked sperm) can occur either at the site of the vas occlusion or in the epididymis. Most granulomas are small and asymptomatic; however, some may cause a tender nodule to appear in the scrotum. Sperm granulomas can cause failure of the vasectomy, if fistulous tracts develop through the granuloma that permit passage of sperm to the urethral vas, thereby restoring fertility. Granulomas occurring in the epididymal region may make reversal procedures more difficult.

Follow-up studies have reported symptomatic granulomas in 0–3% of vasectomy cases. However, during reversal procedures, granulomas at the vasectomy site have been found in 15–40% of cases. Granulomas in the epididymis have been reported in 10–50% of cases at the time of reversal (Liskin et al., 1983, p. D-70). In most cases of symptomatic granulomas, discomfort will subside within weeks with mild analgesics; if these are not effective, the granuloma can be surgically removed. One study reports fewer granulomas at the vasectomy site and fewer failures with the electrocoagulation technique than with simple ligation (Schmidt and Free, 1978). However, another suggests that the more complete occlusion of the vas by coagulation may result in greater numbers of epididymal granulomas, causing epididymal obstruction (Silber, 1978).

Several major studies have recently been completed that assess the long-term safety of vasectomy. These studies were prompted primarily by two concerns: (1) reports that vasectomized monkeys developed atherosclerosis more rapidly than unvasectomized controls, and (2) the theoretical concern that sperm antibodies produced in vasectomized men (occurring in 40–70% of men after vasectomy) may have adverse health consequences.

Large-scale studies in men have consistently shown no adverse effects of vasectomy. Specifically, they show no increased incidence of heart disease, hypertension, or other signs of atherosclerosis. In addition, when a wide variety of

other diseases that could possibly be associated with alterations in the system have been assessed, no associations with vasectomy have been found (Goldacre et al., 1983; Massey et al., 1983; Petitti et al., 1982; Walker et al., 1983). The consistency of these major studies, across different study designs, has strengthened the conclusion that vasectomy poses no identifiable long-term risk to physical or mental health (Liskin et al., 1983).

Effectiveness

Pregnancy rates among wives of vasectomized men are similar to those for women who have been sterilized and lower than those for women using reversible methods. Failure rates have ranged from 0% to 2.2% in various studies, and most are under 1% (Liskin et al., 1983, p. D-66). However, most reports of vasectomy effectiveness have utilized the crude rate of failures per 100 procedures rather than failures per 100 years of exposure or failures with the life-table method. Therefore, comparisons with rates for other contraceptive methods and for female sterilization techniques are difficult. Moreover, since many of the series report the experience of only one surgeon, it is difficult to know whether the technique would be as successful in the hands of a wide variety of surgeons. For example, one study reported no failures in over 4,000 cases of ligating or coagulating the vas and interposing fascia between the two divided ends, but all of these procedures were performed by only one surgeon (Liskin et al., 1983, p. D-67).

A pregnancy can occur after unprotected coitus shortly after the vasectomy, before sperm have been cleared from the male reproductive tract. Such a pregnancy would not necessarily be attributed to failure of the technique, but could be related either to inadequate instructions or to noncompliance with instructions to use contraceptives for the first 15 ejaculations or six weeks after vasectomy. Whenever possible, a semen analysis should be performed after 15 ejaculations or six weeks, whichever comes first, to ensure that the semen is sperm-free.

Spontaneous recanalization of the vas following sperm granuloma is the most common cause of technical failure of vasectomy. Recanalization will usually occur within the first 3-4 months after vasectomy, but can also occur as much as 2-3 years afterwards. Other causes of failure include congenital duplication of the vas that goes undetected at surgery and failure to identify the correct structure within the scrotum during surgery. Congenital duplication of the vas is estimated to occur in fewer than one in 100,000 men (Goldstein and Feldberg, 1982).

Reversibility

Despite the admonition that vasectomy be chosen only as a permanent procedure, it is inevitable that changes in their life situation will lead some men to request reversals. The frequency of requests for reversal is generally unknown; however, it has been estimated at 1-3 per 1,000 cases in various countries (Liskin et al., 1983, p. D-78). The most common reasons for reversal requests are remarriage after divorce or death of a partner, death of one or more children, desire for more children, or problems of either physiological or psychologic nature that the acceptor believes will be alleviated by a reversal of the vasectomy.

Reversal requires difficult surgery, is expensive, and demands a high level of surgical expertise. Because the vas is very small, microsurgical techniques have been developed to help position and attach the two ends of the vas to be rejoined (vasovasostomy). In the presence of an epididymal granuloma, it may be necessary to join a segment of the vas to the fine tubule in the epididymis. Termed a "vasoepididymostomy," this procedure is technically difficult and generally less successful. In various series with and without magnification (microsurgical and macrosurgical techniques), most surgeons report 30-60% success in terms of a subsequent pregnancy; some series have reported even higher pregnancy rates (Liskin et al., 1983, p. D-79). Of course, even higher percentages of men will have sperm in the ejaculate; however, the sperm quantity or quality may not be sufficient to achieve pregnancy. In addition, some of the female partners may have become infertile.

The success of reversal may depend not only upon the skill and technique of the microsurgeon, but also upon the original procedure done, the length and position of the segment of vas removed, the method for occlusion of the vas (coagulation vs. ligation), and the time elapsed since the vasectomy. Reversal is usually more successful when done within 10 years after vasectomy. One microsurgeon reported that in his experience with 121 men, 91% achieved a normal sperm count when reversal was performed within 10 years, but only 35% did so more than 10 years following vasectomy (Silber, 1979, p. 290).

The evidence is inconclusive as to whether sperm antibodies that are built up after vasectomy may continue to impair fertility after vasectomy reversal. For men whose sperm counts return to normal after reversal, but whose levels of sperm antibodies in the blood serum remain high, pregnancy rates are lower than for men with lower sperm antibody levels (Liskin et al., 1983, p. D-81). If sperm antibodies or other factors that develop over time have a negative influence on fertility, there may be an upper limit on the success that can be expected with reversal techniques.

There seems little likelihood that any new advances within the next five years will make vasectomy a reversible procedure to the extent that it could be offered as a temporary contraceptive method. Even if the theoretical reversal rate were to be consistently above 90%, the complex surgery required, with the requirement for skilled microsurgeons, makes reversal impractical or unavailable for men in many parts of the world.

9. DEMOGRAPHIC EFFECTIVENESS

"Demographic effectiveness" refers to the effects of sterilization on a population, as distinct from its effects on an individual. For an individual, its action is sure, foreclosing all future births, with only a trivial risk of failure. But for a population, the effects depend upon who adopts sterilization, and upon what these individuals would have done to control their fertility if sterilization had not been available. If acceptors come from a group at low risk of pregnancy or if they would have had few births anyway, demographic effectiveness is reduced. This likelihood can be gauged by a number of indicators.

The chief determinants of demographic effect are biological, social, and programmatic. *Biologically*, the main determinant is age, in that the older the woman the fewer the births prevented. Furthermore, since age is correlated with parity, in general, the higher the parity the fewer the births prevented also. But a countervailing factor is the open interval. Among unprotected women the statistical risk of conceiving again declines with the interval since the last birth, since those most prone to conceive again tend to do so early. Thus, in addition to age and parity, it is desirable to consider this interval in assessing births prevented. In fact, many acceptors at all parities have short intervals since their last birth, implying a strong program effect. Moreover, the interval since last birth separates high-risk from low-risk women more sharply as age advances.

As regards age, it is true that sterilization acceptors have a higher mean age than acceptors of other contraceptive methods, but far more notable is the great overlap in age distributions. Large proportions of sterilization acceptors are in fact younger than the mean age of IUD or pill acceptors. This is one reason why sterilization averts more births on average than do the other methods (another reason being its prolonged continuation). Moreover, persons choosing sterilization are by no means typical of their own age-group: They generally have had much higher fertility in the previous five years, and they are at risk of much higher fertility in the future, as indicated by studies of matched groups and by figures on the significant proportions of older nonacceptors who are infecund or menopausal.

Social determinants sort out the population by likelihood that an alternative method, or no method, would be adopted if sterilization were unavailable. Some subgroups of the population—for example, the better educated—use a variety of birth control methods, and we can assume that many of them would seek other protection if sterilization were not an option. The demographic effects of sterilization can be considered modest for such subgroups, just as they can be for some entire nations in which the level of development is high, the population makes use of a variety of other reliable methods, and fertility is low. If sterilization, or any other single method, were to disappear in such countries, the birthrate would probably be little affected. If *most* methods were withdrawn, however, fertility would be expected to rise.

One indicator of the contribution of sterilization is whether those adopting it report prior use of modern birth control methods. Among such cases sterilization probably has less demographic effect, since these acceptors have demonstrated their willingness to use alternatives. However, those alternatives were apparently unsatisfactory, and the move is to a more reliable, longer continuation method. Other indicators that correlate with prior use, and with lower fertility levels prior to the procedure, are higher education and income, urban residence, and higher development level of the country. In addition, there are basic customs that help establish the level of background fertility—such as the duration of breastfeeding and rules governing resumption of coitus after childbirth—and wherever these reduce the level of natural fertility, sterilization obviously has less demographic effect. Some areas have an appreciable amount of infecundity due to sexually transmitted disease, which has social roots but is biological in effect.

Programmatic activities to provide sterilization services and to encourage their use tend to raise the numbers of acceptors, and the demographic effect again depends upon the risk of pregnancy and upon what the acceptors would have done otherwise. Where alternative protection is easily available and widely used, the effect must be considered weaker, although the acceptors can be a selective group with high expected fertility. Approximate measures of expected fertility have been taken from matched groups of individuals, or from the preacceptance fertility of the acceptors themselves. Where these are unavailable, a common substitute is the prevailing fertility level of other married fecund women of the same age. Programs that offer sterilization and other methods to women living in rural areas and urban slum areas, or to high-risk subgroups such as women who have recently given birth (as in postpartum programs), have greater demographic effects, since alternatives are little used and birthrates are high.

The effects of the three groups of determinants just discussed are reflected in the statistics below, although the available information is not sufficiently refined to trace the effects of each one separately. Comments are made on these and on more specific factors as figures are presented.

A review of the literature yields a number of actual estimates of births averted per sterilization, which are compiled in Table 9.1. The calculation methods vary so greatly as to defy any systematic summary, but we have entered comments in the last column, usually pertaining to the estimate of potential fertility employed. Readers interested in pursuing the technical features of any of the estimates may consult the references cited in the table.

In general, the estimates lie between 1.50 and 2.50 births averted per sterilization, across a variety of countries and time periods. Given the large differences in methodology,

this range is reasonably narrow.

In some cases, a single method has been used for direct comparison of births averted by sterilization and by the IUD. The results for India are summarized as follows:

Sterilization	*IUD*	*Source*
2.35	0.54	Simmons, 1971
2.39	0.70	Jain, 1969
2.5 (male)	0.75	Repetto, 1968 (Madras only)

A further method comparison is available for the Philippines, for which Laing estimates 2.7 births averted for sterilization acceptors, given their 1977 age distribution. The number ranges from 5.95 births averted among acceptors ages 15–24 to 0.32 at ages 40 and over. He points out that among acceptors aged 35–39, sterilization averts 0.98 births, more than the pill, rhythm, or condoms avert among acceptors of any age (Laing, 1982, pp. 134-136). (For age differentials in India, see Simmons, 1971, p. 64; for Bangladesh, see Osteria et al., 1978, p. 10, and Measham et al., 1981, p. 59.)

The above estimates give in general the number of births averted *per sterilized woman*. Other analyses of demographic effect give births averted *per ever-married woman*, and these are naturally lower due to the larger base. Sterilizations in the population reduce the total marital fertility rate (TMFR),* depending upon such factors as the numbers done, the ages and parities at which they occur, and the rates chosen to represent the future fertility of sterilized couples had they not been sterilized. Westoff and colleagues have used data for the five years prior to the World Fertility Surveys in several countries to estimate the fall so far in the TMFR due to sterilizations. Further, in a second calculation, they have estimated the TMFR decline if the fertility and sterilization rates of the last five years were to persist indefinitely, and this decline is greater, since it assumes that the new generations coming up would be subject to the high recent rates of sterilization.

The results are that the TMFR has declined 2–14% due to sterilizations in seven countries studied, as shown on page 52. These percentages should be higher now, since many of the

*The TMFR is the total of the fertility rates experienced at each duration of marriage in a specified time period, calculated for all ever-married women. It gives the number of children one woman would have if she married at the starting age and survived through the reproductive years.

Table 9.1. Births averted per sterilization, and method of calculation: Selected countries and years

Country and year	Sex[1]	Births averted	Method[2]	Comments
Bangladesh				
1980[3]	F	1.20–1.76		Potential fertility based on family size of nonacceptors at each age who wanted no more children.
Mass sterilization campaign, 1977[4]	F	1.84	Simmons, 1971	
	M	1.30	Simmons, 1971	
Matlab Thana modified contraceptive distribution program, 1978[4]	F	2.03	Simmons, 1971	ASFR from Matlab Thana. 17.5% correction, for higher fertility of acceptors (10.0%) and previous use of contraceptives (27.5%) (Osteria et al., 1978, p. 12).
Colombia				
1974[5]		1.57	SCYP	MASFR as adjusted.
1975[5]		1.63	SCYP	MASFR as adjusted.
India				
1961[6]	F	2.1	Simmons, 1971	MASFR corrected for age distribution of wives in one sample of vasectomy cases.
	M	2.35	Simmons, 1971	
1969[7]	F	2.39	Jain, 1969	All-India MASFR (Jain, 1969, p. 38).
Kerala				
1969[8]	F	2.48		Potential fertility based on recent fertility ratio of a matched group.
1970–71[9]	F	1.76	Jain, 1969	All-India ASFR adjusted for older age distribution in Kerala State.
Kerala, Ernakulam District				
Camp no. 1 1970–71[9]	M	2.00	Jain, 1969	All-India ASFR adjusted for age distribution in camps.
Camp no. 2 1970–71[9]	M	2.22	Jain, 1969	All-India ASFR adjusted for age distribution in camps.

Table 9.1. Births averted per sterilization, and method of calculation: Selected countries and years *(continued)*

Country and year	Sex[1]	Births averted	Method[2]	Comments
Kerala, Ernakulam District (continued)				
Distribution program 1970–71[9]	M	2.14	Jain, 1969	All-India ASFR adjusted for age distribution in camps.
Gujarat				
1971[10]	F	2.74 (A)	Simmons, 1971	Estimates A, B, C, and D differ in fertility schedules used.
		2.78 (B)	Simmons, 1971	
		1.68 (C)	Talwar et al., 1971	
		1.72 (D)	Talwar et al., 1971	
Madras				
Year unclear[11]	M	2.5		Uses ASFR of acceptors.
Korea, Republic of				
1971[5]		0.78	SCYP	MASFR as adjusted.
1972[5]		0.93	SCYP	MASFR as adjusted.
1975[5]		1.04	SCYP	MASFR as adjusted.
Malaysia				
1972[5]		1.74	SCYP	MASFR as adjusted.
1973[5]		1.83	SCYP	MASFR as adjusted.
1974[5]		1.96	SCYP	MASFR as adjusted.
Nepal				
1972[5]		1.18	SCYP	MASFR as adjusted.
1973[5]		2.07	SCYP	MASFR as adjusted.
Philippines				
1977[12]	F	2.7		Uses preacceptance fertility rates for IUD users, corrected for fecundity and survival probabilities (Laing, 1982, p. 133).
Puerto Rico				
1965[13]	F	2–3		Compares lifetime fertility of sterilized and nonsterilized women.
Singapore				
1973[5]		0.88	SCYP	MASFR as adjusted.
1974[5]		0.92	SCYP	MASFR as adjusted.
1975[5]		0.99	SCYP	MASFR as adjusted.
Sri Lanka				
1973[5]		1.59	SCYP	MASFR as adjusted.
1974[5]		1.52	SCYP	MASFR as adjusted.
1975[5]		1.76	SCYP	MASFR as adjusted.
Thailand				
1974[5]		2.67	SCYP	MASFR as adjusted.
Tunisia				
1975[5]		1.37	SCYP	MASFR as adjusted.

Notes and References

1. Where sex is unspecified in the source, the cell is left blank; however, in such cases, the acceptors involved are almost always female.
2. The cell is filled if the method is associated with a particular researcher or is formally documented; otherwise, the cell is left blank.
3. Measham et al., 1981, p. 59.
4. Osteria et al., 1978, p. 18.
5. Ross et al., 1982.
6. Simmons, 1971, p. 65.
7. Jain, 1969, p. 40.
8. Haynes et al., 1969.
9. Soni, 1971, p. 26.
10. Ghosh, 1976, p. 10.
11. Repetto, 1968.
12. Laing, 1982, p. 136.
13. Presser, 1970, p. 17.

World Fertility Surveys were taken some years ago. Under the second calculation (see second column below), assuming that the sterilization rates and baseline fertility rates were to persist indefinitely, the TMFR would fall by 5–19% in the seven countries (over 10% in five countries, and over 15% in three countries). Again, these figures would be higher currently because the observed sterilization rates have since risen (McCarthy, 1982; Westoff et al., 1980).

The specific figures for the percentage declines are as follows:

Selected countries	*Simple calculation*	*Calculation assuming recent rates continue*
Colombia	2%	5%
Costa Rica	8%	13%
Dominican Republic	8%	16%
Fiji	9%	18%
Korea, Republic of	3%	9%
Panama	14%	19%
Sri Lanka	3%	11%

A quite different approach to the question of demographic effectiveness is to estimate the effects upon the national birthrate. For example, Simmons estimated that in India, births in 1967 were reduced by 4.4% due to the national family planning program, which had started in 1956 and been largely directed toward sterilization. Presser's study of Puerto Rico, where over 34% of mothers aged 20-49 had been sterilized as of 1965, showed that sterilization "was largely responsible for the 1950-1965 decline in the total fertility rate from 5.2 to 4.0 births per woman" (Presser, 1969).

A uniform calculation for nine countries and for various years was made with the standard couple years of protection (SCYP) method. The results are included in Table 9.1. Potential fertility in each country was the marital-age–specific fertility rates (MASFR) for the general population, raised to correct for the proportion infecund at each age. The SCYP method incorporates a large number of additional corrections and adjustments (Gorosh and Wolfers, 1977) and estimates lifetime births averted.

The range of results for the SCYP entries in Table 9.1 is from a low of 0.78 births averted in the Republic of Korea to 2.67 in Thailand; in most countries, the number falls between 1.0 and 2.0. The Republic of Korea and Singapore have the lowest values, which is not surprising since the marital fertility rates are lowest there. Over time, every country with figures for multiple years shows a rising value for births averted; this pattern is due to the regularly falling ages of acceptors, a trend that is confirmed in numerous sets of data.

It was not possible to test the effect of trends in marital fertility rates over time, since only a single set of rates was available for each country. However, the rates have generally fallen over time, as a reflection of increasing use of birth control; and these declines would tend to produce decreasing values for the births averted estimates. Similar declines are expected, of course, for any contraceptive method when taken alone. It is the combined effect of all birth control methods together that produces the overall fall in marital fertility. In a rich environment, where numerous effective methods are available and widely used, any single method can be removed without much loss, as most users can easily shift to alternatives. But if another method is subtracted, and then others, progressively more users are left with unsatisfactory options, and overall prevalence declines. Thus, the contribution of any single method may be minor where several choices exist, but major if it is the only one. That is the basic phenomenon reflected in the Republic of Korea and Singapore, for example. If most sterilization acceptors there were to employ instead the rather extensive variety of methods used by the rest of the population, their fertility would still be relatively low. This is not true, however, in various other countries, where alternatives are fewer or methods are less accessible.

TABLES A–I

Table A. Number of sterilization acceptors, by sex: Selected countries and years[1]

Country and year	Total (in 000s)	Male (in 000s)	Female (in 000s)	References
Antigua				
1978	0.1[2]	—	0.1	IPPF, 1983
1979	0.1[2]	—	0.1	
1980	0.2[2]	—	0.2	
Aruba				
1978	0.1[2]	—	0.1	IPPF, 1983
1979	0.1[2]	—	0.1	
1980	0.2[2]	—	0.2	
1981	0.2[2]	—	0.2	
1982	0.2[2]	—	0.2	
Australia[3]				
1973–74	85.5	31.5	54.0	Frances and Kovacs, 1983;
1974–75	—	25.6	—	Leavesley, 1982
1975–76	—	22.6	—	
1976–77	—	—	—	
1977–78	—	23.1	—	
1978–79	—	22.3	—	
1979–80	58.7	23.0	35.7	
Bangladesh				
1966	—	3.9	—	O'Leary et al., 1975;
1967	—	46.0	—	Bangladesh, 1983
1968	—	252.8	—	
1969	—	389.5	—	
1970	—	314.2	—	
1971	—	16.6	—	
1972–73	0.4	0.2	0.1	
1973–74	1.5	0.4	1.0	
1974–75	19.2	14.5	4.7	
1975–76	48.9	37.8	11.1	
1976–77	116.3	75.1	41.2	
1977–78	77.4	32.6	44.7	
1978–79	106.4	24.7	81.7	
1979–80	198.8	27.5	171.2	
1980–81	258.5	26.0	232.5	
1981–82	302.9	69.3	232.8	
1982–83	363.2	88.5	274.6	
Botswana				
1973	0.0	—	—	Nortman, 1978
1974	0.1	—	—	
1975	0.1	—	—	
1976	0.2	—	—	
China, People's Republic of				
1971	2,969	1,224	1,745	Tien, 1982
1972	3,803	1,716	2,087	
1973	4,889	1,933	2,956	
1974	3,721	1,445	2,276	
1975	5,913	2,653	3,260	
1976	4,190	1,490	2,700	
1977	5,392	2,616	2,776	

Table A. Number of sterilization acceptors, by sex: Selected countries and years[1] (*continued*)

Country and year	Total (in 000s)	Male (in 000s)	Female (in 000s)	References
Colombia				
1971	—	0.6	—	Ojeda, 1983
1972	0.9[2]	0.9	0.0	
1973	1.5[2]	1.0	0.5	
1974	3.7[2]	1.1	2.6	
1975	9.3[2]	0.9	8.4	
1976	18.8[2]	0.8	18.0	
1977	37.8[2]	0.7	37.1	
1978	41.0[2]	0.7	40.4	
1979	48.2[2]	0.6	47.6	
1980	35.6[2]	0.6	35.1	
1981	38.1[2]	0.5	37.6	
1982	49.8[2]	0.5	49.2	
1983	51.3[2]	0.7	50.6	
Costa Rica				
1959	0.6	—	—	Rosero et al., 1980
1960	0.5	—	—	
1961	0.7	—	—	
1962	0 9	—	—	
1963	1.0	—	—	
1964	1.0	—	—	
1965	1.2	—	—	
1966	1.3	—	—	
1967	1.9	—	—	
1968	2.1	—	—	
1969	2.1	—	—	
Denmark[4]				
1974	7.0	4.3	2.6	Liskin et al., 1983;
1975	14.1	9.7	4.5	Knudsen, 1983
1976	14.1	9.6[5]	4.4	
1977	12.7	6.3	6.4	
1978	11.9	4.9	7.0	
1979	11.2	4.3	6.9	
1980	11.5	4.8	6.7	
1981	11.8	4.7	7.1	
Dominica				
1978	0.1	—	0.1	IPPF, 1983
Dominican Republic				
1977	4.5	0	4.5	CONAPOFA, 1983
1978	14.3	0	14.3	
1979	18.4	0	18.4	
1980	16.1	0	16.1	
1981	9.8	0	9.8	
1982	14.3	0	14.3	
1983[6]	12.9	0	12.9	

Table A. Number of sterilization acceptors, by sex: Selected countries and years[1] (*continued*)

Country and year	Total (in 000s)	Male (in 000s)	Female (in 000s)	References
Ecuador				
1978	0.7	—	0.7	IPPF, 1983
1979	2.4	—	2.4	
1980	3.6	—	3.6	
1981	4.5	—	4.5	
1982	4.4	—	4.4	
El Salvador				
1972	0.4	0.0	0.4	Nortman, 1978, 1982;
1973	4.6	0.0	4.6	Rigoberto and DeRazeghi,
1974	5.7	0.0	5.7	1983 (for 1979–83)
1975	10.8	0.4	10.4	
1976	12.3	0.3	12.0	
1977	16.1	0.3	15.8	
1978	18.9	0.3	18.6	
1979	17.5	0.2	17.3	
1980	16.0	0.1	15.9	
1981	13.9	0.1	13.8	
1982	14.4	0.1	14.4	
1983[7]	14.6	0.1	14.6	
England and Wales				
1971	—	—	61.7	BCT, 1981; Eugenics Soc.,
1972	—	—	60.5	1983; Dunnell, 1979
1973	—	—	62.2	
1974	74.4	15.1[8]	59.2	
1975	69.7	20.0	49.7	
1976	80.1	20.5	59.6	
1977	83.7	20.4	63.3	
1978	97.7	22.4	75.2[9]	
Fiji				
1968	1.9	—	—	Bavadra and Kierski, 1980
1969	0.6	—	—	(for 1968–77); Nortman,
1970	3.2	—	—	1982 (for 1978–80)
1971	1.1	—	—	
1972	1.0	—	—	
1973	3.0	—	—	
1974	1.2	—	—	
1975	1.8	—	—	
1976	0.5	—	—	
1977	1.0	—	—	
1978	1.1	—	—	
1979	1.7	—	—	
1980	1.1	—	—	
Finland				
1951	0.8	—	0.8	Liskin et al., 1983;
1955	1.2	—	1.2	Rasimus, 1983
1960	3.2	—	3.2	
1965	3.2	—	3.2	
1966	3.5	—	3.5	
1967	4.0	—	4.0	
1968	4.3	—	4.3	
1969	5.4	—	5.4	

Table A. Number of sterilization acceptors, by sex: Selected countries and years[1] (*continued*)

Country and year	Total (in 000s)	Male (in 000s)	Female (in 000s)	References
Finland (*continued*)				
1970	5.7	—	5.7	
1971	4.3	0.3	4.0	
1972	3.7	0.4	3.3	
1973	3.0	0.3	2.7	
1974	2.4	0.2	2.2	
1975	2.4	0.2	2.2	
1976	2.2	0.2	2.0	
1977	2.2	0.2	2.0	
1978	2.3	0.2	2.1	
1979	2.4	0.2	2.2	
1980	3.0	0.2	2.7	
1981	3.6	0.2	3.4	
1982	4.7	0.2	4.5	
Guatemala				
1977	3.6	0.6	3.0	Nortman, 1982; IPPF,
1978	5.7	0.7	5.0	1983
1979	7.7	0.8	6.9	
1980	8.8	1.0	7.7	
1981	8.6	1.5	7.1	
1982	9.8	1.3	8.5	
Honduras				
1978	1.2[2]	0.0	1.2	IPPF, 1983
1979	3.8[2]	0.0	3.8	
1980	3.7[2]	0.0	3.7	
1981	3.9[2]	0.0	3.8	
1982	5.0[2]	0.0	4.9	
Hong Kong				
1966	0.4	0.1	0.3	O'Leary et al., 1975;
1967	0.8	0.1	0.7	Nortman, 1978, 1982
1968	—	—	—	
1969	0.8	0.1	0.7	
1970	—	—	—	
1971	—	0.2	—	
1972	0.4	0.3	0.1	
1973	0.4	0.3	0.1	
1974	0.7	0.6	0.1	
1975	0.8	0.7	0.1	
1976	0.8	0.7	0.1	
1977	1.0	0.7	0.3	
1978	0.9	0.6	0.3	
1979	1.3	0.8	0.5	
1980	1.2	0.6	0.6	
India				
1956	7.0	2.3	4.7	Khan, 1980; Soni, 1983;
1957	13.7	4.1	9.6	India, 1984
1958	25.1	9.2	15.9	
1959	42.3	17.6	24.7	
1960	64.3	37.6	26.7	
1961	104.6	63.9	40.7	
1962	157.9	112.3	45.6	

Table A. Number of sterilization acceptors, by sex: Selected countries and years[1] (*continued*)

Country and year	Total (in 000s)	Male (in 000s)	Female (in 000s)	References
India (*continued*)				
1963	170.2	114.6	55.6	
1964	269.6	201.2	68.4	
1965–66[10]	670.8	576.6	94.2	
1965–66	671	577	94	
1966–67	887	785	102	
1967–68	1,840	1,648	192	
1968–69	1,665	1,383	282	
1969–70	1,422	1,056	366	
1970–71	1,330	879	451	
1971–72	2,187	1,620	567	
1972–73	3,122	2,613	509	
1973–74	942	403	539	
1974–75	1,354	612	742	
1975–76	2,669	1,438	1,230	
1976–77	8,261	6,199	2,062	
1977–78	949	188	761	
1978–79	1,484	391	1,093	
1979–80	1,778	473	1,305	
1980–81	2,029	435	1,594	
1981–82	2,784	570	2,214	
1982–83	3,981	590	3,391	
India by state and other subdivisions				Nortman, 1982
Andhra Pradesh				
1976	755.6	—	—	
1977	139.2	27.1	112.1	
1978	192.2	46.7	145.5	
1979	181.1	35.0	146.1	
Assam				
1976	230.4	—	—	
1977	13.7	7.9	5.8	
1978	25.3	18.1	7.2	
1979	22.3	14.4	7.9	
Bihar				
1976	583.3	—	—	
1977	35.0	10.0	25.0	
1978	88.9	31.0	57.9	
1979	85.6	25.6	60.0	
Gujarat				
1976	323.0	—	—	
1977	111.8	25.5	86.3	
1978	197.4	54.2	143.2	
1979	220.2	53.2	167.0	
Haryana				
1976	225.2	—	—	
1977	5.9	1.0	4.9	
1978	13.9	2.4	11.5	
1979	27.0	4.4	22.6	

Table A. Number of sterilization acceptors, by sex: Selected countries and years[1] (*continued*)

Country and year	Total (in 000s)	Male (in 000s)	Female (in 000s)	References
Himachal Pradesh				
1976	102.9	—	—	
1977	1.8	0.3	1.5	
1978	7.0	2.6	4.4	
1979	17.5	3.8	6.7	
Jammu and Kashmir				
1976	16.1	—	—	
1977	24.0	2.7	3.8	
1978	9.3	4.7	4.6	
1979	8.4	3.8	4.6	
Karnataka				
1976	439.5	—	—	
1977	94.1	8.4	85.7	
1978	190.1	4.9	91.1	
1979	117.2	5.6	111.6	
Kerala				
1976	210.5	—	—	
1977	82.8	15.3	67.5	
1978	90.1	15.1	75.0	
1979	99.0	14.3	84.7	
Madhya Pradesh				
1976	1,020.1	—	—	
1977	37.2	6.5	30.7	
1978	80.3	25.6	54.7	
1979	125.8	48.1	77.7	
Maharashtra				
1976	878.7	—	—	
1977	118.1	17.3	100.8	
1978	177.9	29.6	148.3	
1979	289.2	108.6	180.6	
Manipur				
1976	6.4	—	—	
1977	0.7	0.6	0.1	
1978	2.1	1.6	0.5	
1979	2.5	1.9	0.6	
Meghalaya				
1976	7.7	—	—	
1977	0.2	—	—	
1978	0.2	—	—	
1979	0.2	—	—	
Nagaland				
1977	0.1	—	—	
1978	0.1	—	—	
1979	0.1	—	—	
Orissa				
1976	326.3	—	—	
1977	81.9	25.6	56.3	
1978	105.1	26.2	78.9	
1979	89.1	16.2	72.9	

Table A. Number of sterilization acceptors, by sex: Selected countries and years[1] (*continued*)

Country and year	Total (in 000s)	Male (in 000s)	Female (in 000s)	References
Punjab				
1976	142.0	—	—	
1977	13.0	1.9	11.1	
1978	20.5	3.1	17.4	
1979	28.0	4.3	23.7	
Rajasthan				
1976	371.3	—	—	
1977	12.6	1.9	10.7	
1978	20.9	4.4	16.5	
1979	47.3	11.0	36.3	
Sikkim				
1977	0.2	—	—	
1978	0.3	0.2	0.1	
1979	0.4	0.2	0.2	
Tamil Nadu				
1976	580.5	—	—	
1977	111.6	20.7	90.9	
1978	216.4	91.3	125.1	
1979	157.6	35.4	122.2	
Tripura				
1976	12.9	—	—	
1977	0.5	0.3	0.2	
1978	0.7	0.5	0.2	
1979	0.9	0.6	0.3	
Uttar Pradesh				
1976	853.3	—	—	
1977	13.5	1.3	12.2	
1978	29.3	4.6	24.7	
1979	56.3	9.3	47.0	
West Bengal				
1976	896.7	—	—	
1977	35.8	3.6	32.2	
1978	67.5	10.6	56.9	
1979	155.8	61.7	94.1	
Delhi				
1976	141.1	—	—	
1977	5.7	0.7	5.0	
1978	7.9	1.3	6.6	
1979	12.0	1.8	10.2	
Other territories				
1976	19.8	—	—	
1977	6.4	0.4	6.0	
1978	9.3	1.0	8.3	
1979	9.4	0.9	8.5	
Ministry of Defense facilities				
1976	27.0	—	—	
1977	14.6	7.2	7.4	
1978	17.7	8.9	8.8	
1979	18.5	9.1	9.4	

Table A. Number of sterilization acceptors, by sex: Selected countries and years[1] (*continued*)

Country and year	Total (in 000s)	Male (in 000s)	Female (in 000s)	References
Ministry of Railways facilities				
1976	88.4	—	—	
1977	5.8	1.2	4.6	
1978	7.6	2.2	5.4	
1979	8.8	2.1	6.7	
Indonesia				
1970	0.2	—	—	O'Leary et al., 1975;
1971	1.4	—	—	PKMI, 1985.
1972	—	—	—	
1973	—	—	—	
1974–75	9.7	2.0	7.7	
1975–76	14.7	2.1	12.6	
1976–77	22.5	3.5	19.0	
1977–78	35.0	9.6	25.5	
1978–79	39.9	7.4	32.4	
1979–80	46.7	6.0	40.6	
1980–81	55.1	5.3	49.8	
1981–82	63.5	6.4	57.0	
1982–83	89.5	18.9	70.6	
1983–84	110.0	16.6	93.4	
Iran				
1976	0.3	0.1	0.2	Nortman, 1982
1977	1.6	0.4	1.2	
Jamaica				
1972	1.1	0	1.1	Nortman, 1978
1973	2.4	0	2.4	
1974	2.7	0	2.7	
1975	3.2	0	3.2	
Japan				
1949	5.8	0.0	5.7	Uchida, 1975; Cortés,
1950	11.4	0.1	11.3	1980; Sunata, 1984;
1951	16.2	0.2	16.0	Muramatsu, 1979
1952	22.4	0.4	22.0	
1953	32.6	0.6	31.9	
1954	38.1	1.0	37.1	
1955	43.3	1.5	41.7	
1956	44.5	1.8	42.7	
1957	44.4	1.9	42.5	
1958	42.0	1.6	40.3	
1959	40.1	1.2	38.9	
1960	38.7	1.1	37.6	
1961	35.5	1.0	34.4	
1962	32.4	1.0	31.5	
1963	32.7	0.8	31.8	
1964	29.5	0.8	28.8	
1965	27.0	0.7	26.3	
1966	23.0	0.5	22.5	
1967	21.5	0.6	20.9	
1968	18.8	0.4	18.5	
1969	17.4	0.4	17.0	

Table A. Number of sterilization acceptors, by sex: Selected countries and years[1] (*continued*)

Country and year	Total (in 000s)	Male (in 000s)	Female (in 000s)	References
Japan (*continued*)				
1970	15.8	0.3	15.5	
1971	14.1	0.3	13.8	
1972	11.9	—	—	
1973	11.7	—	—	
1974	10.7	—	—	
1975	10.1	0.2	9.9	
1976	9.5	0.2	9.3	
1977	9.5	0.2	9.3	
1982	8.0	0.1	7.9	
Korea, Republic of				
1962	3.4	3.4	0.0	Cho and Koh, 1983;
1963	19.9	19.9	0.0	Koh et al., 1980
1964	26.3	26.3	0.0	
1965	12.9	12.9	0.0	
1966	19.9	19.9	0.0	
1967	19.7	19.7	0.0	
1968	16.0	16.0	0.0	
1969	15.5	15.5	0.0	
1970	17.3	17.3	0.0	
1971	18.6	18.6	0.0	
1972	19.7	16.4	3.3	
1973	24.5	19.7	4.8	
1974	37.4	32.0	5.4	
1975	57.6	43.1	14.5	
1976	80.4	44.9	35.5	
1977	235.2	53.7	181.4	
1978	230.3	36.9	193.4	
1979	221.1	25.9	195.3	
1980	207.1	28.0	179.1	
1981	196.1	31.3	164.8	
Malaysia				
1967	0.6	—	—	O'Leary et al., 1975;
1968	2.6	—	—	Nortman, 1982
1969	2.7	—	—	
1970	3.5	—	—	
1971	4.0	—	—	
1972	3.9	0.4	3.5	
1973	4.1	0.3	3.8	
1974	4.2	0.3	3.9	
1975	3.9	0.2	3.7	
1976	3.9	0.2	3.7	
1977	3.7	0.2	3.5	
1978	4.8	0.2	4.6	
1979	4.7	0.2	4.5	
1980	5.1	0.2	4.9	

Table A. Number of sterilization acceptors, by sex: Selected countries and years[1] (*continued*)

Country and year	Total (in 000s)	Male (in 000s)	Female (in 000s)	References
Mexico				
1974	13	—	—	Nortman, 1978, 1982
1975	15	—	—	
1976	—	—	—	
1977	147	—	—	
1978	147	—	—	
1979	136	—	—	
Nepal				
1967–68	1.1	1.1	—	Nepal, 1983c
1968–69	3.3	3.3	—	
1969–70	3.9	3.9	—	
1970–71	4.4	4.4	—	
1971–72	3.9	3.9	—	
1972–73	4.8	4.2	0.6	
1973–74	6.0	5.2	0.8	
1974–75	4.4	3.7	0.7	
1975–76	11.4	9.2	2.2	
1976–77	16.4	11.0	5.4	
1977–78	20.1	12.2	7.9	
1978–79	18.2	7.0	11.2	
1979–80	15.4	4.3	11.1	
1980–81	22.8	4.8	18.0	
1981–82	30.6	10.4	20.2	
1982–83	45.0	16.5	28.5	
Netherlands				
1970	2.5	1.5	1.0	Ketting, 1982
1971	10.8	7.0	3.8	
1972	23.0	16.0	7.0	
1973	43.0	27.0	16.0	
1974	55.0	31.0	24.0	
1975	62.0	31.0	31.0	
1976	84.0	39.0	45.0	
1977	82.0	37.0	45.0	
1978	108.0	51.0	57.0	
1979	132.0	69.0	63.0	
1980	105.0	55.0	50.0	
1981	75.0	42.0	33.0	
New Zealand[11]				
1978	12.8[12]	—	—	Foster, 1982
1979	12.9	—	—	
1980	10.5	—	—	
1981	9.6	—	—	
1982	8.4	3.6	4.7	
Norway				
1977	6.3	2.3	4.0	Noack, 1983
Pakistan				
1965	0.5	—	—	O'Leary et al., 1975;
1966	1.9	—	—	Ravenholt et al., 1973;
1967	1.7	—	—	Nortman, 1978, 1982
1968	50.2	—	—	

Table A. Number of sterilization acceptors, by sex: Selected countries and years[1] (*continued*)

Country and year	Total (in 000s)	Male (in 000s)	Female (in 000s)	References
Pakistan (*continued*)				
1969	28.0	—	—	
1970	8.0	—	—	
1971	4.0	—	—	
1972	—	—	—	
1973	3.3	—	—	
1974	5.4	—	—	
1975	11.4	2.9	8.5	
1976	14.6	1.7	12.9	
1977	7.2	0.6	6.6	
1978	13.2	0.7	12.5	
1979	24.9	0.7	24.2	
Panama				
1972	3.7	—	—	Nortman, 1978
1973	3.4	—	—	
1974	4.5	—	—	
1975	0.8	—	—	
Philippines				
1974	1.4	0.4	1.0	Nortman, 1982;
1975	32.5	9.2	23.3	Laing, 1982
1976	47.9	10.3	37.6	
1977	68.6	8.0	60.6	
1978	53.1	4.3	48.8	
1979	47.4	2.0	45.4	
1980	52.6	1.9	50.7	
1981	63.5	1.8	61.7	
1982	70.9	—	—	
Puerto Rico				
1972	0.9	—	—	Nortman, 1978
1973	1.0	—	—	
1974	5.9	—	—	
1975	9.0	—	—	
Scotland				
1977	14.1	3.1	11.0	BCT, 1981
1978	14.1	3.0	11.1	
Singapore				
1965	0.5	0	0.5	O'Leary et al., 1975;
1966	0.5	0	0.5	Pakshong, 1981
1967	0.7	0	0.7	
1968	1.1	0	1.1	
1969	1.4	0	1.4	
1970	2.4	0.1	2.3	
1971	4.0	0.1	3.9	
1972	6.1	0.3	5.8	
1973	9.3	0.4	8.9	
1974	9.5	0.3	9.2	
1975	9.6	0.4	9.2	

Table A. Number of sterilization acceptors, by sex: Selected countries and years[1] (*continued*)

Country and year	Total (in 000s)	Male (in 000s)	Female (in 000s)	References
Singapore (*continued*)				
1976	9.9	0.4	9.5	
1977	7.7	0.3	7.4	
1978	6.9	0.3	6.6	
1979	6.3	0.5	5.8	
1980	5.7	0.4	5.3	
Sri Lanka				
1966	3.0	—	—	O'Leary et al., 1975;
1967	3.6	—	—	SLAVSC, 1983a, 1983b
1968	5.2	—	—	
1969	2.9	—	—	
1970	5.0	—	—	
1971	4.3	0.2	4.1	
1972	9.6	0.5	9.1	
1973	20.2	1.9	18.4	
1974	42.2	7.3	34.9	
1975	39.4	6.0	33.1	
1976	35.6	2.9	32.7	
1977	19.1	1.3	17.8	
1978	21.9	2.3	19.6	
1979	35.6	5.6	30.0	
1980	112.9	51.3	61.6	
1981	76.6	30.3	46.3	
1982	60.2	13.1	48.9	
1983	103.8	44.8	59.0	
St. Lucia				
1978	0.4[2]	—	0.4	IPPF, 1983
1979	0.3[2]	—	0.3	
1980	0.3[2]	—	0.3	
1981	0.3[2]	—	0.3	
1982	0.3[2]	—	0.3	
Taiwan				
1972	0.3	0.0	0.3	Nortman, 1978;
1973	2.1	0.4	2.0	Taiwan, 1983
1974	12.7	1.0	11.7	
1975	16.7	1.3	15.4	
1976	33.5	2.5	31.0	
1977	38.7	3.7	35.0	
1978	48.5	3.6	44.9	
1979	51.8	3.9	47.9	
1980	53.9	2.9	51.0	
1981	54.4	2.9	51.5	
1982	50.2	3.0	47.2	
1983	53.1	3.0	50.1	
Thailand				
1969	15.3	—	—	TAVS, 1983
1970	18.6	—	—	
1971	23.5	—	—	
1972	32.7	1.3	31.4	
1973	49.6	2.8	46.8	
1974	80.5	6.8	73.7	

Table A. Number of sterilization acceptors, by sex: Selected countries and years[1] (*continued*)

Country and year	Total (in 000s)	Male (in 000s)	Female (in 000s)	References
Thailand (*continued*)				
1975	90.2	7.5	82.7	
1976	105.3	10.2	95.1	
1977	125.9	19.1	106.8	
1978	168.5	44.3	124.2	
1979	174.0	35.3	138.7	
1980	182.8	31.1	151.7	
1981	177.7	28.4	149.3	
1982	167.0	23.4	143.6	
Trinidad and Tobago				
1970	0.3	—	—	O'Leary et al., 1975;
1971	0.3	—	—	IPPF, 1983
1978	0.4[2]	—	0.4	
1979	0.3[2]	—	0.3	
1980	0.4[2]	—	0.4	
1981	0.4[2]	—	0.4	
1982	0.4[2]	—	0.4	
Tunisia				
1965	—	—	0.4	O'Leary et al., 1975;
1966	—	—	0.8	Nortman, 1978, 1982;
1967	—	—	0.7	Tunisia, 1983
1968	—	—	1.6	
1969	—	—	2.5	
1970	—	—	2.5	
1971	—	—	2.3	
1972	2.5	0	2.5	
1973	5.0	0	5.0	
1974	10.8	0	10.8	
1975	9.9	0	9.9	
1976	8.3	0	8.3	
1977	8.0	0	8.0	
1978	8.8	0	8.8	
1979	8.1	0	8.1	
1980	8.5	0	8.5	
1981	8.7	0	8.7	
1982	9.6	0	9.6	
United States				
1970	—	—	201	CDC, 1983; AVS, 1984
1971	978	701	277	
1972	912	554	358	
1973	886	432	454	
1974	1,022	515	507	
1975	1,079	504	575	
1976	1,130	507	623	
1977	1,174	437	737	
1978	1,158	461	697	
1979	1,114	435	679	
1980	1,208	511	697	
1981	1,141	424	717	
1982	949	299	650	
1983	1,077	455	622	

Table A. Number of sterilization acceptors, by sex: Selected countries and years[1] (*continued*)

Country and year	Total (in 000s)	Male (in 000s)	Female (in 000s)	References
Venezuela				
1971	0.1	—	—	O'Leary et al., 1975
1972	0.1	—	—	
1973	0.1	—	—	
Zimbabwe				
1973	0.0	—	—	Nortman, 1978
1974	0.1	—	—	
1975	0.1	—	—	

Notes

1. Males and Females may not add exactly to Total because of rounding.
2. These estimates are for IPPF affiliate only. They do not reflect total number of sterilization acceptors in the country.
3. Figures come from the medical benefits (rebates) provided by the Commonwealth Department of Health. They exclude services rendered in hospitals to standard ward patients free of charge. Thus, they are considered underestimates. Estimates for female sterilization acceptors are from Leavesley, 1982.
4. All men treated as outpatients since 1977 are not included. Hence, 3,000 male outpatients in 1979 are excluded.
5. The 1976 figure covers the period Apr. 1–Dec. 31, 1976, plus one-quarter of all vasectomies for the period Apr. 1, 1975–Mar. 31, 1976. Data for later years do not cover vasectomies performed in outpatient settings.
6. Oct.–Dec. estimated.
7. Estimations based on statistical data Jan.–June 1983.
8. Apr.–Dec. in family planning clinics.
9. This is an estimate of sterilizations performed in National Health System hospitals. If we account for those carried out privately, the female total is probably around 100,000 a year or even more (Newton, 1982, p. 5).
10. Jan. 1965–Mar. 1966.
11. These statistics are approximately 50% underestimates. See Pool and Sceats, 1982.
12. Mar.-Dec. 1978.

Table B. Prevalence of sterilization and number of users, by sex: Selected countries and years[1]

Country and year	Prevalence			Number of users (in 000s)			Reference
	Total	Male	Female	Total	Male	Female	
Argentina							
1964 (Buenos Aires)[2,3]	0.3	—	—	—	—	—	CELADE and CFSC, 1972
Australia							
1971 (Melbourne)[4]	3	—	—	—	—	—	Lucas, 1983
1972 (Victoria)[5]	6	—	—	—	—	—	Lucas, 1983
1978 (Victoria)[5]	20	6	14	—	—	—	Lucas, 1983
1978 (Victoria)[3]	16	5	11	—	—	—	Lucas, 1983
1978 (Canberra)[6]	23	10	13	—	—	—	Lucas, 1983
1978 (Canberra)[3,6]	19	8	11	—	—	—	Lucas, 1983
1979 (Canberra)[3,7]	22.2	6.4	15.8	—	—	—	Lucas and McMurray 1983
Bangladesh							
1974	—	—	—	307.7	304.2	3.5	AID, 1974
1975	—	—	—	287.6	276.8	10.8	AID, 1975
1975-76[5,8]	0.8	0.5	0.3	—	—	—	Carrasco, 1981
1976	1.2	—	—	188	—	—	Nortman, 1976
1976	—	—	—	279.7	255.7	24.0	AID, 1976
1977	2.2	—	—	405	—	—	Nortman, 1980
1979[5]	3.4	0.9	2.5	—	—	—	WHS, 1984
1980	3.0	—	—	519.7	—	—	Nortman, 1982
1981	4.8	0.8	4.0	—	—	—	Bangladesh, 1981a
1983	7.4	1.2	6.2	—	—	—	Mitra and Kamal, 1984
Barbados							
1980-81[5]	14.7	0.3	14.4	—	—	—	WHS, 1984
Belgium							
1975-76[9]	5.1	0.0	5.1	—	—	—	Berent, 1982
Botswana							
1976	—	—	0.2	—	—	—	Rodrigues et al., 1983
Brazil							
1964 (Rio de Janeiro)[2,3]	6.1	—	—	—	—	—	CELADE and CFSC, 1972
1965 (São Paulo)	6.9	—	—	—	—	—	Merrick, 1983
1973 (Rio Grande do Sul)[10]	5.5	—	—	—	—	—	Merrick, 1983
1978 (São Paulo)	16.1	—	—	—	—	—	Nakamura et al., 1980
1979 (Piauí)	15.4	0.0	15.4	—	—	—	Thomé et al., 1982
1980 (Bahía)	9.6	—	—	—	—	—	Thomé et al., 1982
1980 (Paraíba)	15.7	—	—	—	—	—	Thomé et al., 1982
1980 (Pernambuco)	18.9	—	—	—	—	—	Thomé et al., 1982
1980 (Rio Grande do Norte)	17.4	—	—	—	—	—	Thomé et al., 1982
1981 (Paraná)	19.7	—	—	—	—	—	Rodrigues et al., 1983
1981 (S. Region)	14.6	—	—	—	—	—	Rodrigues et al., 1983
1981 (Rio Grande do Sul)	11.3	—	—	—	—	—	Rodrigues et al., 1983
1981 (Santa Catarina)	10.9	—	—	—	—	—	Rodrigues et al., 1983
1982 (Amazonas, urban)[11]	33.1	—	—	—	—	—	Morris, 1984
1982 (Piauí)	19.5	—	—	—	—	—	Morris, 1984
Bulgaria							
1976	1.5	0.8	0.8	—	—	—	Berent, 1982

Table B. Prevalence of sterilization and number of users, by sex: Selected countries and years[1] *(continued)*

Country and year	Prevalence			Number of users (in 000s)			Reference
	Total	Male	Female	Total	Male	Female	
Canada[12,13]							
1982 (Quebec)	41.2	9.7	31.5	—	—	—	Marcil-Gratton and Lapierre-Adamcyk, 1983
1984[6,8]	43.5	12.9	30.6	—	—	—	Balakrishnan, 1985
1984[8,12]	41.5	13.2	28.3	—	—	—	Balakrishnan, 1985
1984[3,6,8]	32.8	8.7	24.1	—	—	—	Balakrishnan, 1985
China, People's Republic of							
1982[14]	24.5	6.9	17.6	42,475	12,004	30,471	China, 1983
Colombia							
1964 (Bogotá)[2,3]	1.1	—	—	—	—	—	CELADE and CFSC, 1972
1974 (Bogotá)[15]	—	—	1.5	—	—	—	Green, 1978
1976[5]	4.2	0.2	4.0	—	—	—	Carrasco, 1981
1977	6.8	0.2	6.6	210.7	6.6	204.1	Nortman, 1978
1978	—	—	—	248.0	—	—	Nortman, 1980
1978[5]	7.5	0.1	7.4	—	—	—	WHS, 1984
1980[5]	10.8	0.3	10.5	—	—	—	Colombia, 1983
Costa Rica							
1964 (San José)[2,3]	6.0	—	—	—	—	—	CELADE and CFSC, 1972
1974	—	—	—	20.6	0	20.6	AID, 1974
1976[15]	13.3	1.0	12.3	—	—	—	Carrasco, 1981
1978	14.8	0.8	14.0	—	—	—	WHS, 1984
1981[5]	—	—	—	56.7	1.6	55.1	Nortman, 1982
1981	18.0	1.0	17.0	—	—	—	Rosero, 1981
Cuba[6]							
1971 (Plaza de la Revolución)[3,5,16]	7.3	—	7.3	—	—	—	Hollerbach and Díaz-Briquets, 1983
1972 (Ciudad Santa Clara)[3,5,16]	12.5	—	12.5	—	—	—	Hollerbach and Díaz-Briquets, 1983
1972 (Yateras)[5,17]	5.1	—	5.1	—	—	—	Hollerbach and Díaz-Briquets, 1983
1973 (Ciudad Bauta)[3,5,16]	8.4	—	8.4	—	—	—	Hollerbach and Díaz-Briquets, 1983
1973 (Municipio Marianao)[3,5,16]	9.3	—	9.3	—	—	—	Hollerbach and Díaz-Briquets, 1983
1980 (Arroyo Naranjo)[5]	15.8	—	15.8	—	—	—	Hollerbach and Díaz-Briquets, 1983
Czechoslovakia							
1977[12]	2.9	0.0	2.9	—	—	—	Berent, 1982
Denmark							
1975[12,18]	12.8	—	—	—	—	—	UNDIESA, 1984
Dominican Republic							
1975[5]	12.0	0.1	11.9	—	—	—	Carrasco, 1981
1977	12	—	—	120	—	—	Nortman, 1980
1980	21.0	0.0	21.0	—	—	—	Morris, 1983b

Table B. Prevalence of sterilization and number of users, by sex: Selected countries and years[1] *(continued)*

Country and year	Prevalence			Number of users (in 000s)			Reference
	Total	Male	Female	Total	Male	Female	
Ecuador							
1966 (Guayaquil)[2,3]	6.5	—	—	—	—	—	CELADE and CFSC, 1972
1966 (Quito)[2,3]	6.6	—	—	—	—	—	CELADE and CFSC, 1972
1974	—	—	—	1.0	0.1	0.9	AID, 1974
1975	0.1	—	—	1.1	—	—	Nortman, 1980
1975	—	—	—	1.6	0.3	1.3	AID, 1975
1979[5]	8.0	0.2	7.8	—	—	—	UNDIESA, 1984
1982	12.4	0.0	12.4	—	—	—	Ecuador, 1982
Egypt							
1980[5]	1.0	0.1	0.9	—	—	—	Egypt, 1980
1980 (rural)[5]	0.7	0.1	0.7	—	—	—	Khalifa et al., 1982
1982[5]	1.2	0.0	1.2	—	—	—	Tsui, 1984
El Salvador							
1974	—	—	—	12.6	0.4	12.2	AID, 1974
1975	9.9	—	—	—	—	—	Morris et al., 1981
1975	—	—	—	55.2	2.0	53.2	AID, 1975
1976	9.8	—	—	80.0	—	—	Nortman, 1980
1976	—	—	—	70.5	3.7	66.8	AID, 1976
1978[5]	18.0	0.2	17.8	—	—	—	Morris et al., 1981
1978	—	—	—	144.9	1.6	143.3	Nortman, 1982
England and Wales							
1970	4	—	—	—	—	—	Bone, 1973
1970[8]	6	—	—	—	—	—	Bone, 1973
1976[9]	16.2	8.5	7.7	—	—	—	Berent, 1982
Fiji							
1973	8.2	—	—	6.6	—	—	Nortman, 1973
1974[5]	15.9	0.1	15.8	—	—	—	Carrasco, 1981
1977	15.7	—	—	14.3	—	—	Nortman, 1978
1978	17	—	—	15.2	—	—	Nortman, 1982
Finland							
1977[12,18]	4.0	0.0	4.0	—	—	—	Berent, 1982
France							
1978[3,19]	4.1	0.0	4.1	—	—	—	France, 1981
1978[3,8,19]	7.3	—	—	—	—	—	France, 1981
Ghana							
1979[5]	0.5	0.0	0.5	—	—	—	UNDIESA, 1984
Guadeloupe							
1976[3,5]	7.8	—	7.8	—	—	—	UNDIESA, 1984
Guatemala							
1974	—	—	—	1.6	0.6	1.0	AID, 1974
1976	—	—	—	2.8	0.8	2.0	AID, 1976
1978[5]	6.3	0.4	5.9	—	—	—	Morris et al., 1981
1983[11]	11.2	—	—	—	—	—	Morris, 1984
Guyana							
1975[5]	8.5	0.0	8.5	—	—	—	Carrasco, 1981

Table B. Prevalence of sterilization and number of users, by sex: Selected countries and years[1] *(continued)*

Country and year	Prevalence			Number of users (in 000s)			Reference
	Total	Male	Female	Total	Male	Female	
Haiti							
1977[20]	0.3	0.1	0.2	—	—	—	UNDIESA, 1984
Honduras							
1981	8.2	0.2	8.0	—	—	—	Suazo et al., 1982
Hong Kong							
1969	0.4	—	—	2	—	—	Nortman, 1969
1970	1	—	—	4	—	—	Nortman, 1970
1971	1	—	—	5	—	—	Nortman, 1971
1972	1	—	—	5	—	—	Nortman, 1972
1973	5	—	—	24	—	—	Nortman, 1973
1975	13	—	—	59	—	—	Nortman, 1975
1976	14	—	—	66	—	—	Nortman, 1976
1977	17	2	15	88	12	76	Nortman, 1978
1979	18.4	1.1	17.3	99	6	93	Nortman, 1980
1981	17.7	1.2	16.5	109.2	7.4	101.8	Nortman, 1982
Hungary							
1966[5]	3.7	—	—	—	—	—	Acsadi et al., 1970
1974[21]	1	—	—	—	—	—	Hungary, 1980
1977[18,22]	—	—	1.5	—	—	—	Berent, 1982
1978[18,23]	2.8	—	—	—	—	—	Hungary, 1980
India[24]							
1970	6.3	3.6	2.7	4,871	2,799	2,072	ORG, 1972
1970–71	8.1	—	—	7,533.0	—	—	Soni, 1983
1971–72	9.9	—	—	9,434.7	—	—	Soni, 1983
1972–73	12.3	—	—	11,980.2	—	—	Soni, 1983
1973–74	12.4	—	—	12,350.4	—	—	Soni, 1983
1974–75	12.8	—	—	13,043.2	—	—	Soni, 1983
1975–76	14.4	—	—	15,004.8	—	—	Soni, 1983
1976–77	20.9	—	—	22,258.5	—	—	Soni, 1983
1977–78	20.2	—	—	21,997.8	—	—	Soni, 1983
1978–79	19.9	—	—	22,168.6	—	—	Soni, 1983
1979–80	19.9	—	—	22,666.1	—	—	Soni, 1983
1980–81	20.0	—	—	23,260.0	—	—	Soni, 1983
1980–81	22.4	—	—	—	—	—	Khan and Prasad, 1983
1981–82	20.6	—	—	24,472.8	—	—	Soni, 1983
India by state and other subdivisions							
Andhra Pradesh							
1970	10.3	4.5	5.8	629.0	274.8	354.2	ORG, 1972
1972	12.8	—	—	1,035	—	—	Nortman, 1973
1974	17.3	—	—	1,450	—	—	Nortman, 1976
1977	25	—	—	2,216	—	—	Nortman, 1978
1979	26	—	—	2,322	—	—	Nortman, 1980
1980–81	31.5	—	—	3,148.1	—	—	Khan and Prasad, 1983
1981	26	—	—	2,501.2	—	—	Nortman, 1982
Assam							
1970	1.7	0.1	1.6	36.3	2.1	34.2	ORG, 1972
1972	4.4	—	—	101	—	—	Nortman, 1973
1974	8.4	—	—	201	—	—	Nortman, 1976
1977	23	—	—	554	—	—	Nortman, 1978
1979	19	—	—	531	—	—	Nortman, 1980
1981	18	—	—	527.2	—	—	Nortman, 1982

Table B. Prevalence of sterilization and number of users, by sex: Selected countries and years[1] *(continued)*

Country and year	Prevalence			Number of users (in 000s)			Reference
	Total	Male	Female	Total	Male	Female	
Bihar							
1970	1.6	0.7	0.9	126.1	55.2	70.9	ORG, 1972
1972	4.9	—	—	525	—	—	Nortman, 1973
1974	5.9	—	—	657	—	—	Nortman, 1976
1977	13	—	—	1,430	—	—	Nortman, 1978
1979	12	—	—	1,465	—	—	Nortman, 1980
1980–81	12.0	—	—	1,675.6	—	—	Khan and Prasad, 1983
1981	11	—	—	1,437.4	—	—	Nortman, 1982
Gujarat							
1970	10.4	1.2	9.2	365.5	42.2	323.3	ORG, 1972
1972	15.1	—	—	709	—	—	Nortman, 1973
1974	18.3	—	—	902	—	—	Nortman, 1976
1977	25	—	—	1,281	—	—	Nortman, 1978
1979	12	—	—	1,465	—	—	Nortman, 1980
1980–81	35.1	—	—	1,802.4	—	—	Khan and Prasad, 1983
1981	30	—	—	1,672.5	—	—	Nortman, 1982
Haryana							
1972	8.5	—	—	135	—	—	Nortman, 1973
1974	14.4	—	—	241	—	—	Nortman, 1976
1977	29	—	—	496	—	—	Nortman, 1978
1979	24	—	—	468	—	—	Nortman, 1980
1981	23	—	—	476.3	—	—	Nortman, 1982
Himachal Pradesh							
1972	5.9	—	—	37	—	—	Nortman, 1973
1974	7.6	—	—	51	—	—	Nortman, 1976
1977	26	—	—	174	—	—	Nortman, 1978
1979	22	—	—	153	—	—	Nortman, 1980
1981	22	—	—	161.5	—	—	Nortman, 1982
Jammu and Kashmir							
1972	5.4	—	—	47	—	—	Nortman, 1973
1974	6.2	—	—	56	—	—	Nortman, 1976
1977	9	—	—	85	—	—	Nortman, 1978
1979	9	—	—	84	—	—	Nortman, 1980
1981	9	—	—	91.1	—	—	Nortman, 1982
Karnataka							
1970	4.6	2.6	2.0	175.4	99.1	76.2	ORG, 1972
1972	7.8	—	—	390	—	—	Nortman, 1973
1974	11.0	—	—	576	—	—	Nortman, 1976
1977	20	—	—	1,075	—	—	Nortman, 1978
1979	20	—	—	1,140	—	—	Nortman, 1980
1980–81	23.0	—	—	1,231.6	—	—	Khan and Prasad, 1983
1981	21	—	—	1,277.0	—	—	Nortman, 1982
Kerala							
1970	16.1	10.4	5.7	385.3	248.9	136.4	ORG, 1972
1972	15.5	—	—	482	—	—	Nortman, 1973
1974	18.4	—	—	598	—	—	Nortman, 1976
1977	27	—	—	901	—	—	Nortman, 1978
1979	27	—	—	961	—	—	Nortman, 1980
1980–81	49.1	—	—	2,338.1	—	—	Khan and Prasad, 1983
1981	30	—	—	1,067.7	—	—	Nortman, 1982

Table B. Prevalence of sterilization and number of users, by sex: Selected countries and years[1] *(continued)*

Country and year	Prevalence			Number of users (in 000s)			Reference
	Total	Male	Female	Total	Male	Female	
Madhya Pradesh							
1970	5.1	3.8	1.3	357.5	266.4	91.1	ORG, 1972
1972	9.0	—	—	719	—	—	Nortman, 1973
1974	11.4	—	—	958	—	—	Nortman, 1976
1977	22	—	—	1,960	—	—	Nortman, 1978
1979	21	—	—	1,855	—	—	Nortman, 1980
1980–81	22.0	—	—	2,141.4	—	—	Khan and Prasad, 1983
1981	20	—	—	1,857	—	—	Nortman, 1982
Maharashtra							
1970	14.9	7.4	7.5	1,078.0	535.4	542.6	ORG, 1972
1972	16.6	—	—	1,518	—	—	Nortman, 1973
1974	23.4	—	—	2,244	—	—	Nortman, 1976
1977	35	—	—	3,463	—	—	Nortman, 1978
1979	34	—	—	3,381	—	—	Nortman, 1980
1980–81	33.0	—	—	3,554.9	—	—	Khan and Prasad, 1983
1981	34	—	—	3,648.2	—	—	Nortman, 1982
Manipur							
1974	1.7	—	—	3	—	—	Nortman, 1976
1977	6	—	—	10	—	—	Nortman, 1978
1979	7	—	—	12	—	—	Nortman, 1980
1981	14.8	—	—	8	—	—	Nortman, 1982
Meghalaya							
1974	1.4	—	—	2	—	—	Nortman, 1976
1977	8	—	—	13	—	—	Nortman, 1978
1979	6	—	—	11	—	—	Nortman, 1980
1981	9.8	—	—	5	—	—	Nortman, 1982
Nagaland							
1972[25]	5.7	—	—	94	—	—	Nortman, 1973
1974	0.3	—	—	0.2	—	—	Nortman, 1976
1977	0.3	—	—	0.2	—	—	Nortman, 1978
1979	0.8	—	—	0.7	—	—	Nortman, 1980
1981	0.9	—	—	0.9	—	—	Nortman, 1982
Orissa							
1970	6.7	6.5	0.2	220.0	217.4	6.7	ORG, 1972
1972	12.1	—	—	500	—	—	Nortman, 1973
1974	14.6	—	—	628	—	—	Nortman, 1976
1977	23	—	—	1,020	—	—	Nortman, 1978
1979	23	—	—	1,065	—	—	Nortman, 1980
1980–81	23.0	—	—	1,205.9	—	—	Khan and Prasad, 1983
1981	24	—	—	1,104.2	—	—	Nortman, 1982
Punjab							
1972	9.8	—	—	211	—	—	Nortman, 1973
1974	12.7	—	—	287	—	—	Nortman, 1976
1977	20	—	—	459	—	—	Nortman, 1978
1979	20	—	—	439	—	—	Nortman, 1980
1980–81	24.9	—	—	1,273.1	—	—	Khan and Prasad, 1983
1981	19	—	—	453.3	—	—	Nortman, 1982

Table B. Prevalence of sterilization and number of users, by sex: Selected countries and years[1] *(continued)*

Country and year	Prevalence			Number of users (in 000s)			Reference
	Total	Male	Female	Total	Male	Female	
Rajasthan							
1970	4.3	3.4	0.9	142.2	112.4	29.8	ORG, 1972
1972	4.0	—	—	194	—	—	Nortman, 1973
1974	5.8	—	—	291	—	—	Nortman, 1976
1977	14	—	—	715	—	—	Nortman, 1978
1979	12	—	—	665	—	—	Nortman, 1980
1980–81	17.0	—	—	1,215.7	—	—	Khan and Prasad, 1983
1981	12	—	—	733.3	—	—	Nortman, 1982
Sikkim							
1979	2	—	—	0.8	—	—	Nortman, 1980
1981	3	—	—	1.2	—	—	Nortman, 1982
Tamil Nadu							
1970	3.5	2.1	1.4	257.0	154.2	102.8	ORG, 1972
1972	13.6	—	—	993	—	—	Nortman, 1973
1974	18.4	—	—	1,403	—	—	Nortman, 1976
1977	27	—	—	2,102	—	—	Nortman, 1978
1979	27	—	—	2,140	—	—	Nortman, 1980
1980–81	22.2	—	—	1,952.7	—	—	Khan and Prasad, 1983
1981	27	—	—	2,205.1	—	—	Nortman, 1982
Tripura							
1974	5.7	—	—	16	—	—	Nortman, 1976
1977	12	—	—	34	—	—	Nortman, 1978
1979	10	—	—	29	—	—	Nortman, 1980
1981	8	—	—	25.8	—	—	Nortman, 1982
Uttar Pradesh							
1970	2.0	1.2	0.8	250.6	150.4	100.2	ORG, 1972
1972	4.3	—	—	712	—	—	Nortman, 1973
1974	5.8	—	—	988	—	—	Nortman, 1976
1977	10	—	—	1,851	—	—	Nortman, 1978
1979	9	—	—	1,668	—	—	Nortman, 1980
1980–81	10.1	—	—	1,890.8	—	—	Khan and Prasad, 1983
1981	8	—	—	1,571.1	—	—	Nortman, 1982
West Bengal							
1970	6.9	5.2	1.7	499.2	376.2	123.0	ORG, 1972
1972	8.0	—	—	588	—	—	Nortman, 1973
1974	10.5	—	—	800	—	—	Nortman, 1976
1977	22	—	—	1,785	—	—	Nortman, 1978
1979	21	—	—	1,684	—	—	Nortman, 1980
1980–81	22.5	—	—	2,244.4	—	—	Khan and Prasad, 1983
1981	22	—	—	1,823.4	—	—	Nortman, 1982
Central government institutions							
1972	—	—	—	151	—	—	Nortman, 1973
Delhi							
1977	32	—	—	236	—	—	Nortman, 1978
1979	25	—	—	220	—	—	Nortman, 1980
1980–81	22.5	—	—	196.0	—	—	Khan and Prasad, 1983
1981	23	—	—	224.0	—	—	Nortman, 1982
Other territories							
1977	16	—	—	65	—	—	Nortman, 1978
1979	—	—	—	73	—	—	Nortman, 1980
1981	15	—	—	82.8	—	—	Nortman, 1982

Table B. Prevalence of sterilization and number of users, by sex: Selected countries and years[1] *(continued)*

Country and year	Prevalence			Number of users (in 000s)			Reference
	Total	Male	Female	Total	Male	Female	
Ministry of Defense facilities							
1979	—	—	—	120	—	—	Nortman, 1980
Ministry of Railways facilities							
1979	—	—	—	217	—	—	Nortman, 1980
Indonesia							
1973 (East Java)[5,13,26]	<1.0	—	—	—	—	—	University, 1974
1975	—	—	—	19.7	—	—	AID, 1975
1976[5]	0.3	0.0	0.3	—	—	—	Carrasco, 1981
1977	0.2	—	—	42	—	—	Nortman, 1978
1979	0.5	—	—	104	—	—	Nortman, 1980
1980 (East Java)[5]	0.6	—	—	—	—	—	POPLAB, 1981
1980 (Jakarta)	3.3	0.3	3.0	—	—	—	In-Search, 1981
1981	1.0	—	—	212.5	—	—	Nortman, 1982
1981 (Bandung)	4.9	—	—	—	—	—	In-Search, 1982b
1981 (East Java)	0.5	—	—	—	—	—	POPLAB, 1983
1981 (Jakarta)	2.6	0.3	2.3	—	—	—	In-Search, 1982b
1981 (Jakarta)	3.5	—	—	—	—	—	In-Search, 1982a
1981 (Medan)	0.9	—	—	—	—	—	In-Search, 1982b
1981 (Surabaya)	4.9	—	—	—	—	—	In-Search, 1982b
Iran							
1978	0	—	—	2	—	—	Nortman, 1980
Iraq							
1974[5]	0.6	—	0.6	—	—	—	UNDIESA, 1984
Italy							
1979[12]	0.7	0.0	0.7	—	—	—	UNDIESA, 1984
Jamaica							
1957	0.1	—	—	—	—	—	Mauldin, 1965
1974	—	—	—	0.7	0	0.7	AID, 1974
1975	—	—	—	0.8	0	0.8	AID, 1975
1975–76	8.3	0.2	8.1	—	—	—	Carrasco, 1981
1976	—	—	—	1.3	0	1.3	AID, 1976
1979	9.8	0.0	9.8	—	—	—	Morris et al., 1981
Japan							
1950 (rural)	1.5	—	—	—	—	—	PPRC, 1952
1961[27]	6	1	5				PPRC, 1962
1965	3.4	—	—	—	—	—	PPRC and JOICFP, 1977
1974	8.2	—	—	—	—	—	Muramatsu, 1979
1975	3.1	—	—	—	—	—	PPRC and JOICFP, 1977
1979[5]	4.0	1.1	2.9	—	—	—	PPRC, 1979
Jordan							
1976[5]	1.9	0.1	1.8	—	—	—	UNDIESA, 1984
1983[11]	3.8	0.1	3.7	—	—	—	Zou'bi and Shrydeh, forthcoming
Kenya							
1977–78[20]	0.9	0.0	0.9	—	—	—	Kenya, 1980

Table B. Prevalence of sterilization and number of users, by sex: Selected countries and years[1] *(continued)*

Country and year	Prevalence			Number of users (in 000s)			Reference
	Total	Male	Female	Total	Male	Female	
Korea, Republic of							
1963 (Koyang)	0.9	—	—	—	—	—	Mauldin, 1965
1966	2.0	—	—	—	—	—	KIFP, 1978
1969	3	—	—	112	—	—	Nortman, 1969
1970	3	—	—	118	—	—	Nortman, 1970
1971[19]	3.3	2.3	1.0	—	—	—	KIFP, 1978
1973	4.6	—	—	—	—	—	KIFP, 1978
1974[5]	5.0	3.3	1.7	—	—	—	UNDIESA, 1984
1974	—	—	—	175.0	160.0	15.0	AID, 1974
1975	—	—	—	238.3	207.4	30.9	AID, 1975
1976	—	—	—	232.4	169.4	63.0	AID, 1976
1976	8.3	4.2	4.1	—	—	—	KIFP, 1978
1978[5]	16.5	5.6	10.9	—	—	—	Koh et al., 1980
1979	20.4	5.9	14.5	—	—	—	Morris et al., 1981
1982	28.4	5.2	23.2	—	—	—	UNDIESA, 1984
Lebanon							
1971[5]	1.1	0.0	1.1	—	—	—	UNDIESA, 1984
Lesotho							
1977[5]	0.7	0.0	0.7	—	—	—	Lesotho, 1981
Malaysia							
1969	0.2	—	—	3.1	—	—	Nortman, 1969
1970	0.3	—	—	5.3	—	—	Nortman, 1970
1971	0.6	—	—	9	—	—	Nortman, 1971
1974[5]	3.8	0.4	3.4	—	—	—	Carrasco, 1981
1974	—	—	—	10.3	0.8	9.5	AID, 1974
1976	3	—	—	41	—	—	Nortman, 1978
1979	6	—	—	94	—	—	Nortman, 1980
1981[5]	5.0	—	—	84.8	—	—	Nortman, 1982
Martinique							
1976[3]	9.0	—	9.0	—	—	—	UNDIESA, 1984
Mexico							
1964 (Mexico City)	2.0	—	—	—	—	—	CELADE and CFSC, 1972
1976–77[5]	2.9	0.2	2.7	—	—	—	UNDIESA, 1984
1976–77	4.0	1.0	3.0	—	—	—	Morris et al., 1981
1978[5]	7.5	0.1	7.4	—	—	—	Morris et al., 1981
1979[5]	9.0	0	9	1,530	—	—	Nortman, 1982
1979[5]	9.3	—	—	—	—	—	Morris, 1983b
1982	13.7	—	—	—	—	—	Morris, 1984
Morocco							
1981	1.0	—	1.0	—	—	—	WHS, 1984
Nepal							
1969	0.1	—	—	2	—	—	Nortman, 1969
1970	0.2	—	—	5.5	—	—	Nortman, 1970
1971	0.4	—	—	9.3	—	—	Nortman, 1973
1974	—	—	—	30.4	28.7	1.7	AID, 1974
1975	—	—	—	33.4	31.2	2.2	AID, 1975

Table B. Prevalence of sterilization and number of users, by sex: Selected countries and years[1] *(continued)*

Country and year	Prevalence			Number of users (in 000's)			Reference
	Total	Male	Female	Total	Male	Female	
Nepal (*continued*)							
1975	1.2	—	—	28.7	—	—	Nortman, 1975
1976	—	—	—	46.8	42.0	4.8	AID, 1976
1976[5]	1.8	1.7	0.1	—	—	—	UNDIESA, 1984
1981[5]	5.3	2.9	2.4	—	—	—	Nepal, 1983a
Netherlands[5,28]							
1970	0.0	0.0	0.0	2.4	1.4	1.0	Ketting, 1982
1971	0.5	0.3	0.2	12.6	7.9	4.7	Ketting, 1982
1972	1.1	0.7	0.4	34.3	22.7	11.6	Ketting, 1982
1973	2.4	1.5	0.9	75.6	48.1	27.5	Ketting, 1982
1974	3.9	2.3	1.6	128.3	77.0	51.3	Ketting, 1982
1975	5.7	3.2	2.5	187.3	105.3	82.0	Ketting, 1982
1975	4.5	2.3	2.3	—	—	—	Berent, 1982
1976	8.0	4.2	3.8	268.4	142.2	126.2	Ketting, 1982
1977	10.1	5.1	5.0	343.9	174.2	169.7	Ketting, 1982
1978	12.8	6.3	6.5	444.6	220.3	224.3	Ketting, 1982
1979	16.1	8.0	8.1	566.8	283.6	283.2	Ketting, 1982
1980	18.5	9.2	9.3	659.9	332.6	327.3	Ketting, 1982
1981	19.8	10.0	9.8	720.8	367.9	352.9	Ketting, 1982
1982	20	10	10	—	—	—	Ketting, 1982
New Zealand							
Late 1970s	30.0	—	—	—	—	—	Liskin et al., 1983
Nicaragua							
1975	—	—	—	0.2	0	0.2	AID, 1975
1976	—	—	—	0.3	0	0.3	AID, 1976
Norway							
1977[18,29]	6.4	2.1	4.3	—	—	—	Berent, 1982
1977[3,12]	5.0	1.7	3.3	—	—	—	Norway, 1981
Pakistan							
1974	—	—	—	19.2	5.5	13.7	AID, 1974
1975	—	—	—	27.5	6.9	20.5	AID, 1975
1975[5]	1.0	0.1	0.9	—	—	—	Carrasco, 1981
1976	—	—	—	41.9	8.3	33.6	AID, 1976
1980	0.6	—	—	71.1	—	—	Nortman, 1982
Panama							
1964 (Panama City)	19.9	—	—	—	—	—	CELADE and CFSC, 1972
1976[15]	21.6	0.4	21.2	—	—	—	Carrasco, 1981
1979–80	29.7	0.4	29.3	—	—	—	Monteith et al., 1981
Paraguay							
1977	2.9	—	—	—	—	—	Morris et al., 1978
1979[5]	2.8	0.1	2.7	—	—	—	"Paraguay WFS," 1983
Peru							
1975	—	—	—	0.1	0	0.1	AID, 1975
1977–78[5]	2.8	0.0	2.8	—	—	—	Carrasco, 1981
1981[5]	4.5	0.0	4.5	—	—	—	WHS, 1984

Table B. Prevalence of sterilization and number of users, by sex: Selected countries and years[1] *(continued)*

Country and year	Prevalence			Number of users (in 000s)			Reference
	Total	Male	Female	Total	Male	Female	
Philippines[3]							
1973	0.9	—	—	—	—	—	Laing, 1983
1975	—	—	—	40.3	—	—	AID, 1975
1976	1.6	—	—	40	—	—	Laing, 1983
1976	—	—	—	87.0	—	—	AID, 1976
1977	3.2	0.5	2.7	—	—	—	Laing, 1983
1978[5]	5.4	0.7	4.7	—	—	—	UNDIESA, 1984
1979	6.9	0.6	6.3	—	—	—	Laing, 1983
1980	8.6	0.7	7.9	—	—	—	Laing, 1983
1981	10.2	0.7	9.5	—	—	—	Laing, 1983
1982	11.8	0.7	11.1	—	—	—	Laing, 1983
Poland							
1977[4,5]	4.9	—	—	—	—	—	UNDIESA, 1984
Portugal							
1979–80[5]	1.0	0.1	0.9	—	—	—	UNDIESA, 1984
Puerto Rico							
1947[3,15]	—	—	6.6	—	—	—	Presser, 1970
1953–54[3,15]	—	—	16.5	—	—	—	Presser, 1970
1965[13,15]	—	—	31.4	—	—	—	Presser, 1980
1968[5,13]	35.5	1.4	34.1	—	—	—	Presser, 1980
1968[13,15]	—	—	35.3	—	—	—	Presser, 1980
1974[5,13]	28.5	—	—	—	—	—	Presser, 1980
1974[13,15]	—	—	29.7	—	—	—	Presser, 1980
1976	42.2	2.8	39.3	—	—	—	UNDIESA, 1984
1982[11]	45.6	—	—	—	—	—	Herold et al., 1984
Singapore							
1970	1	—	—	3.8	—	—	Nortman, 1970
1971	2.2	—	—	6.2	—	—	Nortman, 1971
1972	2.8	—	—	7.5	—	—	Nortman, 1972
1973	6.0	—	—	16.4	—	—	Nortman, 1973
1974	10.8	—	—	29.1	—	—	Nortman, 1975
1974	—	—	—	30.4	—	—	AID, 1974
1975	—	—	—	33.2	1.6	31.6	AID, 1975
1976	—	—	—	41.6	2.0	39.6	AID, 1976
1976	17.4	—	—	48.0	—	—	Nortman, 1978
1977	22.0	1.0	21.0	—	—	—	Pakshong, 1981
South Africa							
1975–76	5.2	0.0	5.2	—	—	—	UNDIESA, 1984
Spain							
1977[5,13]	0.3	—	—	—	—	—	Spain, 1980
Sri Lanka							
1969	0.7	—	—	11.2	—	—	Nortman, 1969
1970	1.0	—	—	16	—	—	Nortman, 1970
1974	—	—	—	80.0	—	—	AID, 1974
1974	2.9	—	—	55	—	—	Nortman, 1975
1975[5]	9.9	0.7	9.2	—	—	—	UNDIESA, 1984
1977	18	—	—	339.3	—	—	Nortman, 1982
1982[5]	20.7	3.6	17.1	—	—	—	Sri Lanka, 1983b

Table B. Prevalence of sterilization and number of users, by sex: Selected countries and years[1] *(continued)*

Country and year	Prevalence			Number of users (in 000s)			Reference
	Total	Male	Female	Total	Male	Female	
Sudan (North)							
1979[20]	0.3	0.0	0.3	—	—	—	Sudan, 1982
Syria							
1978[5]	0.4	0.1	0.3	—	—	—	Syria, 1982
Taiwan							
1965[19]	5.4	—	—	—	—	—	Lin, 1975
1967[19]	6.6	—	—	—	—	—	Lin, 1975
1970[31]	7.7	—	—	—	—	—	Lin, 1975
1972[5]	9.3	0.6	8.7	—	—	—	Lin, 1975
1973[32]	8.8	—	—	—	—	—	Lin, 1975
1976[33]	11.3	—	—	—	—	—	Chang et al., 1981
1980[33]	17.5	—	—	—	—	—	Chang et al., 1981
1981	19.6	1.6	18.0	—	—	—	Nortman, 1982
Tanzania							
1976	0	—	—	0.1	—	0.1	AID, 1976
Thailand							
1969–70	7.6	2.1	5.5	—	—	—	Kamnuansilpa and Chamratrithirong, 1982
1972–73	9.7	2.9	6.8	—	—	—	Kamnuansilpa and Chamratrithirong, 1982
1974	—	—	—	282.5	17.9	264.6	AID, 1974
1975	9.6	2.2	7.4	—	—	—	Kamnuansilpa and Chamratrithirong, 1982
1975	—	—	—	371.6	25.3	346.3	AID, 1975
1975[5]	8.4	2.1	6.3	—	—	—	Carrasco, 1981
1976	—	—	—	475.2	35.3	439.9	AID, 1976
1978	16.5	3.5	13.0	—	—	—	Kamnuansilpa and Chamratrithirong, 1982
1981	22.9	4.2	18.7	—	—	—	Kamnuansilpa and Chamratrithirong, 1982
Trinidad and Tobago							
1977[5]	4.5	0.2	4.3	—	—	—	UNDIESA, 1984
Tunisia							
1969	0.5	—	—	3.2	—	—	Nortman, 1969
1970	0.8	—	—	5.0	—	—	Nortman, 1970
1971	1	0	1	8.0	—	—	Nortman, 1971
1972	1	—	—	8.0	—	—	Nortman, 1972
1973	1.3	—	—	9.0	—	—	Nortman, 1973
1974	2.2	—	—	17.0	—	—	Nortman, 1974
1974	—	—	—	20.8	0	20.8	AID, 1974
1975	2.8	—	—	21.0	—	—	Nortman, 1975
1975	—	—	—	36.8	0	36.8	AID, 1975
1976	4.6	—	—	36.8	—	—	Nortman, 1976
1976	—	—	—	44.1	0	44.1	AID, 1976
1977	—	—	5.5	—	—	44.4	Nortman, 1980
1978[5]	7.5	0.0	7.5	—	—	—	UNDIESA, 1984
1979 (Jendouba)	—	—	16.1	—	—	—	Morris et al., 1981
1982[5]	—	—	4.5	—	—	42.5	Nortman, 1982

Table B. Prevalence of sterilization and number of users, by sex: Selected countries and years[1] *(continued)*

Country and year	Prevalence			Number of users (in 000s)			Reference
	Total	Male	Female	Total	Male	Female	
Turkey							
1963	1.0	0.0	1.0	—	—	—	Mauldin, 1965
1978	0.7	0.2	0.6	—	—	—	Hacettepe, 1980
United States							
Various surveys							
1955[34]	4	1	3	—	—	—	Whelpton et al., 1966
1960[34]	6	2	4	2,414	805	1,609	Whelpton et al., 1966
1965[34]	7.8	3.3	4.5	1,927	815	1,112	Westoff, 1976
1970[34]	10.6	5.1	5.5	2,711	1,304	1,406	Westoff, 1976
1973[34]	22.9	8.0	14.9	6,102	2,132	3,970	Ford, 1978
1976[12]	34	—	—	—	—	—	Forrest and Henshaw, 1983
1976[34]	28.3	10.5	17.8	1,693	2,854	4,839	Ford, 1978
1982[35]	39	—	—	—	—	—	Forrest and Henshaw, 1983
1982[3]	21	9	12	11,643	4,860	6,783	Forrest and Henshaw, 1983
1982	27.9	10.4	17.4	7,852	2,942	4,910	Pratt, 1984
1982[8]	38.9	—	—	—	—	—	Pratt, 1984
CDC estimates[3,36]							
1971	—	—	3.0	—	—	—	Nolan et al., 1982
1972	—	—	3.4	—	—	—	Nolan et al., 1982
1973	—	—	4.0	—	—	—	Nolan et al., 1982
1974	—	—	4.7	—	—	—	Nolan et al., 1982
1975	—	—	5.4	—	—	—	Nolan et al., 1982
1976	—	—	6.2	—	—	—	Nolan et al., 1982
1977	—	—	7.1	—	—	—	Nolan et al., 1982
1978	—	—	8.1	—	—	—	Nolan et al., 1982
Venezuela							
1964 (Caracas)	5.6	—	—	—	—	—	CELADE and CFSC, 1972
1977	7.7	0.1	7.6	—	—	—	UNDIESA, 1984
Yemen Arab Republic							
1979[27]	0.2	0.1	0.1	—	—	—	UNDIESA, 1984
Yugoslavia							
1976[8,18]	10.0	—	10.0	—	—	—	UNDIESA, 1984

Notes

1. Unless otherwise specified, prevalence is based on currently married women 15–44 years old.
2. 20–50 years old.
3. All women.
4. Less than 45 years old.
5. 15–49 years old.
6. 18–49 years old.
7. 18 years old and over.
8. Noncontraceptive sterilizations are included.
9. 16–44 years old.

Table B. Prevalence of sterilization and number of users, by sex: Selected countries and years[1] *(continued)*

10. This survey was for three urban areas only.
11. Preliminary and unweighted data for currently married women 15–49 years old. Noncontraceptive sterilizations add about 6% to the total figure.
12. 18–44 years old.
13. Ever-married women.
14. Prevalence rates are for currently married women aged 15–49, while number of users are for those aged 20-49.
15. 20–49 years old.
16. Probability samples of women 15–49 years old.
17. A census of all women of reproductive age.
18. Confined to women who were still in the first marriage.
19. 20–44 years old.
20. 15–50 years old.
21. 15–34 years old.
22. Less than 40 years old.
23. 15–39 years old.
24. Sums of state figures do not agree with the totals for the whole country, since they come from different sources.
25. Includes Moghalaya and Union territories.
26. For "other" methods exclusive of pill, IUD, or condom.
27. Less than 50 years old.
28. Currently married men 17–51 years old.
29. 15 years old and over.
30. Statistics provided by Dr. John Laing, based on trend data from the Community Outreach Surveys (1978 and 1980) and the Area Fertility Surveys on four of the country's 13 regions for 1978, 1979, and 1980, together with inferences from the time series on numbers of sterilizations performed within the program.
31. 22–44 years old.
32. 20–39 years old.
33. 22–39 years old.
34. 18–39 years old.
35. Aged 18–44, excluding those who had had hysterectomies or who were past menopause.
36. Nolan et al., 1982, p. 778, give these rates and similar rates for hysterectomies. Agreement is excellent with the 1976 NSFG.

Table C. Percentage sterilized for contraceptive and noncontraceptive reasons and percentage reported to be infecund: Selected countries and years

Country	Year of survey	Age range	% sterilized for contraceptive reasons		% of wives sterilized for noncontraceptive reasons	% of couples infecund, not surgically sterilized
			Husband	Wife		
Bangladesh	1976	<50	0.5	0.3	0.1	6.9
Belgium (Flemish population)[1]	1975	16–44	0.0		5.6	3.9[2]
Cameroon[3]	1978	15–49	—	—	0.1	11.0
Colombia	1976	15–49	0.2	4.0	1.6	4.1
Costa Rica	1976	20–49	1.0	12.3	3.6	5.3
Czechoslovakia[1]	1977	18–44	0.0		3.0	0.1[4]
Denmark[1]	1975	18–44			12.8[4]	
Dominican Republic	1975	15–49	0.1	11.9	2.2	5.3
Ecuador	1979	15–49	0.2	7.8	1.7	6.3
Egypt	1980	15–49	0.1	0.7	0.6	8.4
Fiji	1974	15–49	0.1	15.8	10.5	
Finland[1]	1977	18–44	0.7	3.6	—	4.4[4]
France[1]	1978	20–44	0.0	4.1	3.6	2.0[4]
Ghana	1979	15–49	0.0	0.5	0.0	9.2
Great Britain[1]	1976	16–44	8.4	7.6	2.8	0.4[4]
Guyana	1975	15–49	0.1	8.1	0.6	5.1
Haiti	1977	15–50	0.1	0.2	0.3	7.6
Hungary[1]	1977	<40	—	1.1	1.0	1.5[4]
Indonesia	1976	<50	0.0	0.3	0.1	16.5
Italy[1]	1979	18–44	0.0	0.7	1.7	5.4[2]
Jamaica	1975–76	15–49	0.0	8.1	1.8	5.6
Jordan (East Bank)	1976	15–49	0.1	1.8	0.9	10.3
Kenya	1977–78	15–50	0.0	0.8	0.0	10.8
Korea, Republic of	1974	15–49	3.3	1.7	0.8	12.2
Lesotho	1977	15–49	0.0	0.8	0.0	13.1
Malaysia (Peninsular)	1974	15–50	0.4	3.4	0.7	10.7
Mexico	1976	15–49	0.2	2.7	1.8	10.8
Nepal	1976	15–49	1.7	0.1	0.3	10.6
Netherlands[1]	1975	—[5]	2.0	2.0	1.2	1.6[2]
Pakistan	1975	15–49	0.1	0.9	11.7	
Panama	1975–76	20–49	0.4	21.2	4.4	2.9
Paraguay	1979	15–49	0.1	2.1	1.7	7.4
Peru	1977	15–49	0.0	2.8	1.9	9.0
Philippines	1978	15–49	0.7	4.7	1.0	10.0
Poland	1977	<45			4.9	
Portugal	1979	15–49	0.1	0.9	2.7	5.8
Spain[1]	1977	15–44	0.3		1.4	2.2[2]
Sri Lanka	1975	15–49	0.7	9.2	0.6	12.9
Sudan (North)	1978–79	15–50	0.0	0.3	0.0	12.7
Syria	1978	15–49	0.1	0.3	11.9	
Thailand	1975	15–49	2.1	6.1	1.3	15.3
Trinidad and Tobago	1977	15–49	0.2	4.3	1.5	3.8

Table C. Percentage sterilized for contraceptive and noncontraceptive reasons and percentage reported to be infecund: Selected countries and years (*continued*)

Country	Year of survey	Age range	% sterilized for contraceptive reasons		% of wives sterilized for noncontraceptive reasons	% of couples infecund, not surgically sterilized
			Husband	Wife		
Tunisia	1978	15–49	0.0	7.5	—— 12.8 ——	
United States	1973	18–39	7.8	8.6	6.5[6]	—
	1976	15–44	9.7	9.6	9.0[6]	1.9
	1982	15–44	10.4	17.4	11.1	—
Venezuela	1977	15–44	0.1	7.6	0.5	2.8
Yemen Arab Republic	1979	<50	0.1	0.1	0.0	12.7
Yugoslavia[1]	1976	15–44	——	——	10.0[2]	——

Notes

1. Confined to women still in the first marriage.
2. May include a small number of women who were not exposed to risk of pregnancy for reasons other than infecundity. However, excludes currently pregnant women, women not exposed because of the absence of the husband, and women included in any of the other categories of this table.
3. Survey did not ask about sterilization, but contraceptive and noncontraceptive sterilization were coded if mentioned. Contraceptive sterilization was coded in the residual category "other methods," which comprises 0.2% of currently married women.
4. May include a small number of women who were not exposed to risk of pregnancy for reasons other than infecundity. However, excludes currently pregnant women and women included in any of the other categories of this table.
5. Marriage cohorts of 1963–1973.
6. Includes cases of noncontraceptive surgical sterilization of the husband (0.8%).

References

For all countries except the United States, UNDIESA, 1984, Table A.II-1, which is based on new tabulations from WFS data tapes and tabulations supplied by the UN Economic Commission for Europe. For the United States, Pratt, 1984; Ford, 1978.

Table D. Sterilization acceptor statistics, by age of wife: Selected countries and years

Country and acceptor period		Sample size (in 000s)	Percentage distribution by wife's age-group							Wife's median age
			<20	20–24	25–29	30–34	35–39	≥40	Unknown	
Bangladesh										
1967–68	All	9.4	— 5.1 —		32.5	39.7	19.0	3.7	0	31.6
1–4/1977	Male	50.1	1.0	7.0	27.6	26.9	26.6	10.9	0	32.7
1–4/1977	Female	25.8	0	0	37.9	32.6	20.6	8.9	0	31.9
1978	Female	0.4	—	—	37.9	32.6	20.6	7.4	1.4	31.7
1978–79	Male[1]	0.3	—	4.1	38.3	45.5	11.7	0.3	0	30.8
1978–79	Female[1]	0.5	—	21.9	43.7	22.1	11.7	0.4	0	28.2
1983	All	—	0.8	15.8	40.4	30.5	10.2	2.4	0	29.1
Brazil (Rio de Janeiro)										
1983	Female	2.0	0.0	0.2	12.6	41.1	31.6	14.4	0.0	34.5
Canada[2]										
1973	Male	0.3	— 1.6 —		12.8	24.9	30.8	29.9	0	36.7[3]
Colombia[4]										
1974	Female	6.6	0.3	4.7	19.3	32.5	27.5	14.3	1.4	33.8
1975	Female	11.4	0.7	4.5	21.1	32.5	28.9	11.4	0.9	33.6
1976	Female	—	—	4.8	25.8	31.6	27.9	9.8	0	33.1
1977	Female	—	—	5.6	30.5	30.8	23.9	9.2	0	32.3
1978	Female	—	—	6.9	32.6	29.9	22.3	8.3	0	31.8
1979	Female	—	—	9.5	33.7	29.1	20.6	7.1	0	31.2
1980	Female	—	—	6.1	32.1	32.2	21.9	7.7	0	31.8
1981	Female	—	—	7.6	32.9	31.2	20.6	7.7	0	31.5
1982	Female	—	—	9.0	35.2	30.3	18.9	6.5	0	31.0
1983	Female	—	—	10.6	34.1	29.5	19.3	6.5	0	30.9
Denmark										
1978	Male	4.9	0.0	0.2	13.0	32.5	27.7	26.2	0	35.8
1978	Female	6.9	0.1	1.6	21.0	38.0	28.1	10.7	0	33.6
1979	Male	4.3	0.0	0.1	12.1	32.6	30.0	24.9	0	35.9
1979	Female	6.9	0.2	1.6	20.9	36.4	29.6	11.2	0	33.8
1980	Male	4.8	0.0	0.1	12.4	32.6	30.0	24.8	0	35.8
1980	Female	6.7	0.0	1.4	20.1	35.3	32.0	11.0	0	34.0
El Salvador										
1–6/1976	Female	5.5	1.1	20.3	36.5	23.7	15.7	2.7	0	28.9
1–6/1983	Female	14.6	5.0	30.8	29.8	19.2	10.9	4.3	0	27.4
Finland										
1980	Female	2.9	0.3	2.2	10.4	31.3	34.1	21.5	0	35.9
1981	Female	3.6	0.0	2.0	10.6	27.9	35.7	23.5	0	36.7
Hong Kong										
1977	Female	0.2	0	1.3	25.0	30.2	25.0	17.7	0.8	33.9
1978	Female	0.3	0.7	1.3	22.5	41.6	23.8	9.8	0.3	33.0
1980	Female	0.6	0	1.8	20.1	43.8	19.3	15.0	0	33.2
India										
7/1970–1/1971	Male	2.8	— 6.0 —		15.5	28.2	30.2	20.1	0	35.0
7/1970–1/1971	Female	2.1	— 3.0 —		21.7	31.3	24.8	19.2	0	34.0
1973–1974	Female	335.8	0.1	7.0	30.5	36.3	20.7	5.4	0	31.7
4/1975–3/1976	Male	1,002.4	1.3	9.4	22.1	29.5	25.9	11.8	0	32.9
4/1975–3/1976	Female	765.5	0.4	7.9	29.6	34.7	22.0	5.4	0	31.7

Table D. Sterilization acceptor statistics, by age of wife: Selected countries and years (*continued*)

Country and acceptor period		Sample size (in 000s)	Percentage distribution by wife's age-group							Wife's median age
			<20	20–24	25–29	30–34	35–39	≥40	Unknown	
India (*continued*)										
4/1977–3/1978	Male	140.4	1.1	12.2	28.5	30.5	19.5	8.2	0	31.3
4/1977–3/1978	Female	541.5	1.0	13.2	36.7	31.7	14.3	3.1	0	29.9
4/1979–3/1980	Male	439.5	0.3	10.2	27.8	32.6	22.2	6.9	0	31.8
4/1979–3/1980	Female	1,211.1	0.5	13.1	36.5	31.3	14.9	3.7	0	30.0
1981–82	Male	—	0.4	9.5	27.2	32.3	22.8	7.8	0	32.0
1981–82	Female	—	0.6	12.8	34.6	32.0	16.5	3.5	0	30.3
India by state and other subdivisions										
Andhra Pradesh										
9–11/1972	Male[5]	0.5	0.0	3.4	22.6	36.6	28.2	9.2	0	33.3
4/1978–3/1979	Male	39.1	1.6	16.5	29.7	28.4	16.7	7.1	0	30.4
4/1978–3/1979	Female	124.2	2.2	22.8	36.1	26.3	10.1	2.5	0	28.5
Assam										
4/1978–3/1979	Male	18.1	0.0	0.2	2.6	10.2	43.0	44.0	0	39.3
4/1978–3/1979	Female	7.2	0.9	8.6	18.9	41.9	25.1	4.6	0	32.6
Bihar										
2/1972	Male[6]	0.5	2.6		24.9	31.0	23.1	14.2	4.2	33.3
4/1978–3/1979	Male	26.2	1.6	8.0	18.6	28.8	27.0	16.0	0	33.8
4/1978–3/1979	Female	45.6	2.1	10.7	24.3	34.8	23.0	5.1	0	31.9
Gujarat										
4/1978–3/1979	Male	54.0	0.2	9.8	29.6	31.6	20.7	8.1	0	31.6
4/1978–3/1979	Female	142.8	0.3	8.4	35.0	35.7	17.3	3.3	0	30.9
Haryana										
11/1971–1/1973	Male[7]	1.0	0.8	2.2	15.3	25.3	29.2	16.4	10.8	35.2
4/1978–3/1979	Male	2.4	0.1	7.0	26.9	34.8	20.7	10.5	0	32.3
4/1978–3/1979	Female	11.5	0.1	7.4	28.8	34.7	21.1	7.9	0	32.0
Himachal Pradesh										
4/1978–3/1979	Male	2.6	0.4	7.1	23.1	32.0	27.9	9.5	0	33.0
4/1978–3/1979	Female	4.4	0.3	24.7	34.2	26.9	11.2	2.7	0	28.7
Jammu and Kashmir										
4/1978–3/1979	Male	2.1	0	9.8	23.0	29.9	28.6	8.7	0	32.9
4/1978–3/1979	Female	2.1	0.1	12.8	27.3	30.2	25.5	4.1	0	31.6
Karnataka										
4/1978–3/1979	Male	4.4	0.3	4.0	17.1	29.8	29.8	19.1	0	34.8
4/1978–3/1979	Female	78.0	0.4	15.0	45.2	27.5	10.5	1.4	0	28.8
Kerala										
1970	All	—	—	—	—	—	—	—	—	38.9
1971	All	—	—	—	—	—	—	—	—	37.4
7–8/1972	All[8]	16.0	0.8	56.6		38.6		4.0	0	28.7
1/1972	All[9]	16.0	0.5	20.3	29.4	23.9	21.7	4.2	0	30.0
1972	All	—	—	—	—	—	—	—	—	35.1
4/1978–3/1979	Male	10.1	1.0	16.2	31.6	32.1	13.2	4.9	0	30.2
4/1978–3/1979	Female	56.9	0.7	13.4	36.8	32.4	13.4	3.3	0	29.9
Madhaya Pradesh										
4/1978–3/1979	Male	20.1	0.2	7.5	29.0	33.0	24.3	6.0	0	32.0
4/1978–3/1979	Female	48.7	0.1	9.6	34.9	34.7	18.2	2.5	0	30.8

Table D. Sterilization acceptor statistics, by age of wife: Selected countries and years *(continued)*

Country and acceptor period		Sample size (in 000s)	Percentage distribution by wife's age-group							Wife's median age
			<20	20–24	25–29	30–34	35–39	≥40	Unknown	
Maharashtra										
4/1978–3/1979	Male	28.0	0.5	9.4	30.3	32.1	20.4	7.3	0	31.5
4/1978–3/1979	Female	136.1	0.2	9.0	36.9	35.4	15.8	2.7	0	30.6
Manipur										
4/1978–3/1979	Male	1.6	0.1	6.9	21.6	35.3	30.0	6.1	0	33.7
4/1978–3/1979	Female	0.5	0	4.1	20.0	39.3	27.8	8.8	0	33.3
Orissa										
4/1978–3/1979	Male	26.2	0.1	9.1	29.9	32.5	21.1	7.3	0	31.7
4/1978–3/1979	Female	78.9	0.2	10.1	28.2	35.7	22.1	3.7	0	31.6
Punjab										
4/1978–3/1979	Male	3.1	0	5.4	21.3	36.9	28.3	8.1	0	33.2
4/1978–3/1979	Female	17.4	0	6.8	23.9	38.8	25.6	4.9	0	32.5
Rajasthan										
4/1978–3/1979	Male	4.4	0.1	6.1	31.0	34.1	20.5	8.2	0	31.9
4/1978–3/1979	Female	16.5	0	11.1	37.2	32.6	14.7	4.4	0	30.3
Tamil Nadu										
11/1971–1/1972	Male[10]	93.0	0.2	5.4	19.8	27.7	31.9	15.0	0	34.4
4/1978–3/1979	Male	91.3	0.2	7.8	28.6	31.7	23.3	8.4	0	32.1
4/1978–3/1979	Female	125.1	0.1	13.6	40.9	28.4	14.3	2.7	0	29.4
Uttar Pradesh										
12/1972–1/1973	Male[11]	7.2	0	1.2	8.7	25.3	36.7	28.1	0	37.0
12/1972–2/1973	Male[12]	7.5	0	1.5	17.2	26.4	30.6	24.3	0	35.8
4/1978–3/1979	Male	3.8	0	5.7	23.8	34.7	26.1	9.7	0	33.0
4/1978–3/1979	Female	19.4	0.6	7.8	29.8	37.3	19.6	4.9	0	31.6
West Bengal										
4/1978–3/1979	Male	10.6	0.3	11.3	31.5	28.7	20.3	7.9	0	31.2
4/1978–3/1979	Female	56.9	0.6	18.9	41.1	24.8	12.1	2.5	0	28.7
Delhi										
4/1978–3/1979	Male	0.8	0.1	4.8	24.8	32.9	23.6	13.8	0	33.1
4/1978–3/1979	Female	4.4	0.1	11.3	36.5	32.2	15.0	4.9	0	30.3
Other territories										
4/1978–3/1979	Male	1.0	0.2	13.1	35.1	30.7	15.8	3.0	2.1	30.3
4/1978–3/1979	Female	8.3	0.3	12.7	35.3	31.1	18.2	2.4	0	30.3
Ministry of Defense facilities										
4/1978–3/1979	Male	8.9	0.2	6.9	32.2	33.7	22.2	4.8	0	31.6
4/1978–3/1979	Female	8.8	0.1	11.7	48.3	25.2	11.6	3.1	0	29.0
Ministry of Railways facilities										
4/1978–3/1979	Male	2.2	0.1	12.4	39.1	25.7	17.9	4.8	0	29.8
4/1978–3/1979	Female	5.4	0.2	16.4	36.7	28.1	15.5	3.1	0	29.6
Indonesia										
10–12/1977	Male	0.2	0.6	5.0	5.6	23.3	37.2	26.7	1.6	37.0
10–12/1977	Female	0.3	0.6	2.5	20.3	36.9	31.7	7.7	0.3	33.6
7–9/1978	Male	0.1	0	4.1	8.1	21.6	33.8	32.4	0	37.4
7–9/1978	Female	0.4	0.5	3.2	20.3	34.8	31.6	9.1	0.5	33.7
9–12/1980	Male	0.1	0	8.3	10.0	25.0	35.0	18.3	3.4	35.7
9–12/1980	Female	0.7	0.7	3.3	19.2	35.7	31.1	9.7	0.3	33.7

Table D. Sterilization acceptor statistics, by age of wife: Selected countries and years *(continued)*

Country and acceptor period		Sample size (in 000s)	Percentage distribution by wife's age-group							Wife's median age
			<20	20–24	25–29	30–34	35–39	≥40	Unknown	
Japan[13]										
1955	All	—	0.5	3.7	24.0	40.9	24.9	6.0	0	32.7
1960	All	—	0.6	3.6	27.2	41.4	23.1	4.1	0	32.2
1965	All	—	0.9	3.8	29.3	42.9	19.2	3.9	0	31.9
1970	All	—	1.1	4.0	31.0	41.0	18.9	4.0	0	31.7
1975	All	—	0.2	4.0	33.2	42.1	16.1	4.4	0	31.5
1977	All	—	0.1	3.3	38.9	38.6	15.7	3.4	0	31.0
Korea, Republic of										
1968	Male	5.4	0.0	1.8	15.9	35.4	35.0	10.5	1.4	34.5
1969	Male	8.0	0.0	0.6	9.3	31.1	38.3	20.5	0	36.2
1970	Male	10.6	0	1	8	32	40	20	0	36.1
1971	Male	7.9	0	1	11	35	37	16	0	35.4
1972	Male	4.3	2.0		17.0	37.0	32.0	11.0	1.0	34.1
1972	Female	3.0	1.0		12.0	29.0	34.0	23.0	1.0	36.1
1973	Male	3.4	1.0		15.0	39.0	34.0	10.0	1.0	34.2
1973	Female	2.4	1.0		11.0	31.0	33.0	23.0	1.0	36.0
1974	Male	21.2	2.5		24.3	40.6	25.7	6.1	0.8	32.8
1974	Female	3.2	2.1		14.5	34.8	31.7	16.0	0.8	34.7
1975	Male	22.4	2.3		24.3	40.1	26.3	7.0	0	32.9
1975	Female	3.2	1.3		16.5	37.3	32.2	12.7	0	34.3
1976	Male	16.5	2.4		25.2	38.5	23.6	10.3	0.0	32.9
1976	Female	12.8	1.3		16.1	41.0	33.9	7.7	0	34.0
1977	Male	52.5	3.3		26.9	38.8	21.9	7.4	1.7	32.4
1977	Female	177.7	2.4		19.6	38.9	32.2	6.5	0.4	33.6
1978	Male	18.9	4.2		30.5	38.9	19.0	6.4	1.0	31.9
1978	Female	40.5	2.7		20.2	37.9	31.9	9.6	0.4	33.5
1979	Male	12.6	3.7		30.2	39.7	18.1	7.0	1.3	31.9
1979	Female	35.3	3.2		21.9	36.9	29.8	7.7	0.5	33.3
1980	Male	27.0	4.7		33.9	37.7	15.8	6.1	1.8	31.3
1980	Female	35.2	3.9		25.4	36.4	25.0	8.6	0.7	32.5
1981	Male	31.1	4.7		34.7	38.5	14.3	5.8	2.0	31.2
1981	Female	40.2	5.0		29.0	36.0	21.1	7.6	1.3	32.1
Malaysia (Peninsular)										
1972	All	3.9	0.1	4.9	18.8	37.8	28.2	10.2	0	33.5
1973	All	4.1	0.1	5.0	22.7	36.7	26.8	8.7	0	33.0
1974	Female	3.4	0	8.0	30.4	20.3	30.7	10.6	0	32.9
1975	Female	—	—	—	—	—	—	—	—	32.7
1976	All	4.0	0.1	5.7	27.8	31.2	24.8	10.4	0	32.6
1977	Female	3.6	0.1	5.4	26.5	32.6	24.6	10.8	0	32.8
1978	Female	4.6	0.2	4.9	26.9	33.6	24.0	10.4	0	32.7
1980	Male	0.2	0.0	3.6	21.0	39.0	24.6	11.8	0	33.2
1980	Female	4.9	0.1	4.9	24.0	36.3	22.8	11.9	0	32.9
Nepal										
7/1972–7/1973	Male	1.7	0	2.0	13.0	25.0	25.0	35.0	0	37.0
7/1973–7/1974	Male	1.8	0.4	10.6	29.3	29.3	17.3	10.3	2.8	31.4
1975–76	Male	1.3	0.7	11.2	28.6	32.4	19.3	7.8	0	31.5
1975–76	Female	0.6	0.4	5.8	28.7	34.9	20.9	9.3	0	32.2

Table D. Sterilization acceptor statistics, by age of wife: Selected countries and years *(continued)*

Country and acceptor period		Sample size (in 000s)	Percentage distribution by wife's age-group							Wife's median age
			<20	20–24	25–29	30–34	35–39	≥40	Unknown	
New Zealand										
1981	Male	4.4	—	1.8	16.5	36.0	23.1	21.2	1.4	34.3
1981	Female	5.2	0.2	4.3	25.1	35.8	22.2	11.5	1.0	32.8
1982	Male	3.6	—	1.4	15.9	35.8	24.0	17.7	5.1	34.2
1982	Female	4.7	—	4.5	24.8	35.4	22.4	11.9	1.0	32.9
Norway										
1982	Male	2.1	—	0.1	8.3	23.9	35.6	31.9	0.1	37.8
1982	Female	6.8	0.1	0.7	9.1	25.6	40.5	23.9	0.0	36.8
Pakistan										
1967–68	—	6.8	—— 6.6 ——		22.3	28.0	26.0	17.1	0	33.8
1976–77	Male	1.3	0.0	1.8	8.8	24.1	30.5	30.1	4.7	37.1
1976–77	Female	7.4	0.2	1.6	9.7	23.4	31.2	30.0	3.9	37.1
Philippines										
7–12/1975	Male	4.1	0.4	7.2	22.0	31.5	26.7	12.1	0.2	33.2
7–12/1975	Female	13.4	0.3	6.8	27.6	32.2	25.4	7.5	0.1	32.4
1976	Male	10.3	1.9	13.5	20.2	19.2	16.3	12.5	16.3	31.6
1976	Female	37.6	0.5	6.6	18.3	23.9	19.4	12.2	19.1	33.1
1977	Female	4.5	0.5	9.1	29.9	31.7	22.8	6.0	0	31.7
6–12/1977	All	28.7	—— 9.8 ——		30.0	32.1	22.1	6.0	0	31.6
1978	All	52.8	—— 11.5 ——		30.4	31.5	20.7	5.9	0	31.3
1–8/1978	Male	3.9	1.7	16.8	32.3	25.9	17.0	5.7	0.6	29.8
1979	All	45.6	—— 10.7 ——		32.7	32.5	19.3	4.8	0	31.0
1980	All	56.6	—— 10.8 ——		33.6	33.8	17.4	4.4	0	30.8
1980	Male	1.3	0.9	10.2	34.8	34.3	16.4	3.3	0	30.6
1980	Female	41.2	1.0	8.8	31.4	32.2	19.6	7.1	0	31.4
1981	All	64.4	—— 11.4 ——		35.9	32.8	16.2	3.7	0	30.4
Singapore										
1972	Female	5.8	0	6	24	39	22	8	1	32.5
1973	Female	8.7	0	6	27	37	22	8	0	32.3
1974	Female	9.2	0	7	29	34	22	8	0	32.1
1975	Female	9.2	0.2	8.9	31.3	32.9	20.2	6.1	0.4	31.4
1976	Male	0.4	1.6	17.1	29.1	30.9	13.1	7.7	0.5	30.3
1976	Female	9.5	0.5	8.3	32.2	30.1	20.7	5.8	2.4	31.3
1978	Male	0.3	3.8	27.3	30.7	23.1	8.5	6.0	0.6	28.0
1978	Female	5.9	0.2	7.7	33.6	36.1	17.6	4.8	0	31.2
1980	Male	0.4	2.8	24.4	40.8	17.2	14.9	0.0	0	27.8
1980	Female	5.3	0.2	7.4	33.7	39.4	14.4	4.9	0	31.1
Sri Lanka										
1973	Female	20.2	0	6.3	24.4	32.6	23.6	7.0	6.0	32.5
1974	All	42.2	0.0	6.5	24.0	30.9	23.9	12.3	2.4	33.0
1974	Male[14]	7.3	0.0	1.2	14.3	25.9	27.9	25.0	5.7	36.0
1974	Female	34.9	0.1	7.6	26.0	31.9	23.0	9.6	1.7	32.4
1975	All	39.2	0.1	8.9	30.5	31.6	21.3	6.0	1.6	31.5
1975	Female[15]	24.9	0.2	9.6	31.0	32.5	20.6	4.3	1.8	31.3
1980	Male	51.3	0.5	11.9	28.2	23.2	17.9	5.6	12.7	30.7
1980	Female	61.6	0.1	10.1	36.4	33.6	16.2	3.4	0.2	30.5
1981	Male	30.3	0.5	12.3	28.9	24.1	19.1	5.5	9.6	30.7
1981	Female	46.3	0.1	11.3	36.4	32.7	15.4	3.2	0.9	30.3
1982–83	Male	0.7	—	—	15.3	31.2	23.1	30.4	0	36.3

Table D. Sterilization acceptor statistics, by age of wife: Selected countries and years *(continued)*

Country and acceptor period		Sample size (in 000s)	Percentage distribution by wife's age-group							Wife's median age
			<20	20–24	25–29	30–34	35–39	≥40	Unknown	
Taiwan										
1972	Female	—	—	6.7	38.5	39.3	12.0	2.6	0.9	30.8
1978	Male	3.9	0.0	7.8	35.9	33.3	17.9	5.1	0	30.9
1978	Female	46.2	0.2	7.3	42.0	32.5	14.2	3.8	0	30.1
1979	Male	3.2	0.0	9.3	37.5	31.3	15.6	6.3	0	30.5
1979	Female	49.6	0.2	8.0	43.5	32.2	12.5	3.6	0	29.8
Thailand										
1973	Female	—	—	—	—	—	—	—	—	30.9
1974	Female	1.1	1.1	14.7	33.4	26.8	18.1	5.6	0.3	30.1
1975	Female	—	0.1	15.8	37.0	25.3	16.5	5.0	0.3	29.6
1976	Male	2.1	0	3.8	18.2	28.7	28.2	20.1	1.0	34.8
1976	Female	1.5	1.4	17.9	33.9	27.9	14.1	4.3	0.5	29.5
1977	Male	0.3	0.3	5.5	23.2	26.0	25.7	19.3	0	34.0
1977	Female	1.7	0.9	19.6	32.8	25.7	16.7	4.3	0	29.5
1978	Male	0.5	0	4.5	22.2	23.6	27.1	22.6	0	34.9
1978	Female	1.2	0.7	22.3	31.8	25.6	14.1	5.4	0	29.2
Tunisia										
1969	Female	1.9	0	2.3	15.3	28.0	33.8	19.6	1.0	35.6
1974	Female	—	—	—	—	—	—	—	—	35.1
1975	Female	8.0	0.0	0.9	9.7	26.8	43.6	19.0	0	36.4
1977	Female	6.6	0.1	1.9	9.0	24.5	42.2	19.1	3.2	36.5
United States[16]										
Sterilizations										
1970	Female	0.2	1.5	13.4	29.9	31.8	16.9	6.5	—	30.8
1971	Female	0.3	1.5	15.2	35.7	28.2	15.2	4.1	—	29.7
1972	Female	0.4	2.0	15.1	32.8	27.4	16.0	6.5	—	30.0
1973	Female	0.4	2.1	14.5	31.7	28.3	16.8	6.7	—	30.3
1974	Female	0.5	1.8	14.8	31.5	28.2	17.3	6.2	—	30.3
1975	Female	0.6	1.6	13.4	32.2	29.6	16.9	6.2	—	30.5
1976	Female	0.6	1.5	15.5	29.1	27.9	16.9	9.0	—	30.7
1977	Female	0.7	1.4	15.8	29.3	29.5	17.0	7.0	—	30.6
1978	Female	0.7	0.9	16.2	28.6	29.1	18.2	6.9	—	30.7
1979	Female	0.6	0.9	17.0	30.6	29.4	16.2	5.8	—	30.3
1980	Female	0.7	1.2	17.8	31.0	29.6	15.2	5.1	—	30.0
Hysterectomies										
1970	Female	0.3	0.3	3.9	12.4	22.6	27.9	32.8	—	37.4
1971	Female	0.3	0.6	4.2	13.4	22.4	26.9	32.3	—	37.1
1972	Female	0.4	0.5	4.6	14.8	24.3	26.0	29.7	—	36.2
1973	Female	0.4	0.4	3.9	16.4	23.7	26.1	29.3	—	36.2
1974	Female	0.4	0.7	4.8	14.9	21.6	25.9	32.1	—	36.9
1975	Female	0.4	0.2	4.2	17.9	23.3	25.6	28.7	—	35.9
1976	Female	0.4	0.4	4.4	17.3	24.1	25.1	28.5	—	35.8
1977	Female	0.4	0.7	5.4	17.2	25.3	25.8	25.6	—	35.3
1978	Female	0.4	0.4	4.7	15.1	24.9	28.1	26.7	—	35.9
1979	Female	0.4	0.2	3.9	14.8	27.9	28.9	24.2	—	35.6
1980	Female	0.4	0.4	5.0	15.4	25.4	27.2	26.4	—	35.7

Table D. Sterilization acceptor statistics, by age of wife: Selected countries and years *(continued)*

Notes

1. Dhaka.
2. All cases from London, Ontario, only.
3. Average age is 36.8.
4. Statistics for IPPF affiliate (PROFAMILIA) only.
5. Camps in Vijayawada.
6. Camps in Monghyr and Mutaffarpur.
7. Camps in Gurgaon district.
8. Camps in Ernakulam.
9. Camps in Trivandrum.
10. Camps in seven districts.
11. Camps in Allahabad.
12. Camps in Meerut.
13. Cases for which age was unknown were excluded.
14. Includes only vasectomies done at the Sri Lanka Association for Voluntary Surgical Contraception (SLAVSC) clinic in Kandy, Sri Lanka.
15. Data for January through September only.
16. All women 15–44 regardless of marital status.

References

All data from D. Nortman, 1969–1976, 1978, 1980, and 1982, except as noted below.
Bangladesh: Hong, 1980 (for 1978 and 1978–1979); Quasem, 1983 (for 1983).
Brazil: CPAIMC, 1984.
Canada: Grindstaff and Ebanks, 1973.
Colombia: Ojeda, 1983.
Denmark: Knudsen, 1983.
El Salvador: Rigoberto and DeRazeghi, 1983.
Finland: Rasimus, 1983.
Japan: Muramatsu, 1979.
Korea, Republic of: KIFP, 1978 (for 1970–1971); Cho and Koh, 1983 (for 1972–1981).
New Zealand: Foster, 1982.
Norway: Noack, 1983.
Philippines: Alfonso, 1982 (for 1977–1981).
Sri Lanka: Vidyasagara, 1984 (for 1980–1981); SLAVSC, 1983b (for 1982–1983).
Taiwan: Taiwan, 1983, p. 43.
United States: recalculation by J. Hughes, CDC, of data in Nolan et al., 1982 (females only). Figures subject to sampling error, entries for age-group 15–19 statistically unreliable.

Table E. Sterilization acceptor statistics, by number of living children: Selected countries and years

Country and acceptor period		Sample size (in 000s)	Percentage distribution by number of living children							Median number of living children
			0-1	2	3	4	5	≥6	Unknown	
Bangladesh										
1967–68	All	9.8	0.1	0.1	17.0	25.4	24.0	33.4	0	4.8
1968–69	Male	—	—— 7.6 ——		—— 50.6 ——		31.4	8.9	1.5	4.4
1978	Male[1]	—	—— 15.7 ——		—— 36.3 ——		35.3	12.7	0	4.4
1978	Female[1]	—	—— 16.0 ——		—— 38.1 ——		34.1	15.9	0	4.3
1983	All[2]	—	2.4	17.4	24.2	21.8	15.6	18.8	0	4.8
Brazil (Rio de Janeiro)										
1983	Female	2.0	2.0	16.7	24.0	21.1	13.2	23.2	0.0	3.8
Canada[3]										
1970	Male	0.3	3.5	29.6	33.5	20.2	9.0	4.2	0	3.0
Colombia[4]										
1974	All	6.6	1.2	4.6	14.8	19.6	15.7	43.0	1.1	5.1
1975	Female	11.4	0.9	4.4	15.8	20.1	17.5	40.4	0.9	5.0
1976	Female	—	1.0	5.0	17.9	19.5	16.7	39.8	0	4.9
1977	Female	—	0.6	5.9	18.6	20.6	16.3	37.9	0	4.8
1978	Female	—	0.8	7.6	21.5	21.7	16.6	31.5	0	4.4
1979	Female	—	0.7	7.2	22.4	23.2	16.3	30.0	0	4.3
1980	Female	—	0.8	7.8	23.7	23.6	16.6	27.3	0	4.3
1981	Female	—	0.9	8.3	26.7	23.8	15.2	25.1	0	4.1
1982	Female	—	0.9	9.4	27.6	24.1	14.6	23.3	0	4.0
1983	Female	—	1.3	11.3	29.2	23.3	14.0	21.0	0	3.9
Finland										
1980	Female	2.7	13.0	34.1	31.3	14.9	4.3	2.4	0.0	2.6
1981	Female	3.4	13.8	36.8	30.3	13.2	3.9	1.8	0.0	2.5
Hong Kong										
1977	Female	0.2	0.9	21.6	37.0	20.7	7.8	11.1	0.9	3.2
1978	Female	0.3	3.0	29.5	35.2	17.5	7.4	7.1	0.3	3.0
1980	Female	0.6	1.6	34.6	30.9	19.8	7.6	5.5	0	2.9
India										
7/1970–1/1971	Male	2.8	3.7	11.3	23.7	23.7	—— 37.6 ——		0	4.0
7/1970–1/1971	Female	2.1	1.9	11.0	15.0	23.7	48.4	—	0	4.4
1973–74	Male	4.0	0.6	19.8	28.3	21.8	13.7	15.5	0.3	3.6
1973–74	Female	4.5	0.7	6.8	23.5	28.5	19.2	20.5	0.8	4.2
4/1974–3/1975	Male	6.8	0.9	18.1	28.1	24.9	14.3	13.6	0.1	3.6
4/1974–3/1975	Female	4.9	0.3	5.7	23.6	30.5	20.3	19.4	0.2	4.2
4/1975–3/1976	Male	8.7	0.6	14.8	27.9	25.1	17.0	14.6	0	3.8
4/1975–3/1976	Female	7.2	0.4	7.1	25.2	28.7	19.0	19.6	0	4.1
4/1977–3/1978	Male	138.2	3.2	33.6	29.8	23.8	—— 9.6 ——		0	2.9
4/1977–3/1978	Female	599.9	1.5	19.5	34.1	30.8	—— 14.1 ——		0	3.4
4/1979–3/1980	Male	440.6	1.6	25.3	32.6	23.3	—— 17.2 ——		0	3.2
4/1979–3/1980	Female	1,209.1	1.2	16.7	34.4	27.5	—— 20.2 ——		0	3.4
1981–82	Male	—	0.8	24.5	37.2	22.8	—— 14.7 ——		0	3.2
1981–82	Female	—	0.7	15.3	35.5	28.3	—— 20.2 ——		0	3.5

Table E. Sterilization acceptor statistics, by number of living children: Selected countries and years *(continued)*

Country and acceptor period		Sample size (in 000s)	Percentage distribution by number of living children							Median number of living children
			0-1	2	3	4	5	≥6	Unknown	
India by state and other subdivisions										
Andhra Pradesh										
9/1972–12/1972	Male[5]	0.5	1.2	26.4	31.4	20.4	9.0	7.6	4.0	3.2
4/1978–3/1979	Male	39.0	4.1	30.1	29.3	19.1	—17.4—		0	3.0
4/1978–3/1979	Female	124.2	3.2	24.6	35.3	23.6	—13.3—		0	3.1
Assam										
4/1978–3/1979	Male	18.1	0	8.4	20.0	46.0	—25.6—		0	4.0
4/1978–3/1979	Female	7.2	0	2.9	24.9	66.9	— 5.3—		0	3.8
Bihar										
2/1972	Male[6]	0.5	0.2	6.4	27.3	36.2	17.9	11.6	0.4	3.9
Gujarat										
11/1971–1/1972	Male[7]	57.0	0.8	8.6	19.4	23.2	20.4	27.6	0	4.4
4/1978–3/1979	Male	54.0	2.1	27.6	29.7	20.1	—20.5—		0	3.2
4/1978–3/1979	Female	142.7	0.7	11.6	30.2	26.8	—30.7—		0	3.8
Haryana										
1/1972	Male[8]	1.0	18.2	28.8	21.1	17.7	8.2	6.0	0	2.6
4/1978–3/1979	Male	2.4	0.2	8.8	38.0	29.8	—23.2—		0	3.6
4/1978–3/1979	Female	11.5	0.1	6.0	31.2	34.7	—28.0—		0	3.9
Himachal Pradesh										
4/1978–3/1979	Male	2.6	0.2	28.0	40.6	18.2	—13.0—		0	3.0
4/1978–3/1979	Female	4.4	0.4	21.9	41.4	21.3	—15.0—		0	3.2
Karnataka										
4/1978–3/1979	Male	4.4	2.0	23.9	30.3	23.3	—20.5—		0	3.3
4/1978–3/1979	Female	1.0	1.0	16.9	35.9	26.9	—19.3—		0	3.4
Kerala										
1/1972	Male[9]	16.0	0.6	22.6	23.5	16.0	12.0	25.3	0	3.7
7–8/1972	Male[10]	16.0	0.6	38.1	25.0	15.3	10.5	10.5	0	3.0
4/1978–3/1979	Male	15.1	3.8	42.5	31.8	13.1	— 8.8—		0	2.6
4/1978–3/1979	Female	71.8	10.9	31.9	34.0	13.0	—10.2—		0	2.7
Madhya Pradesh										
4/1978–3/1979	Male	22.2	2.1	17.7	30.6	26.8	—22.8—		0	3.5
4/1978–3/1979	Female	48.5	0.7	11.3	31.2	29.2	—27.6—		0	3.7
Maharashtra										
4/1978–3/1979	Male	28.0	1.6	18.8	31.9	23.9	—23.8—		0	3.4
4/1978–3/1979	Female	136.1	1.6	10.6	36.3	29.8	—21.7—		0	3.6
Manipur										
4/1978–3/1979	Male	1.6	0.1	10.7	28.7	38.4	—22.1—		0	3.8
4/1978–3/1979	Female	0.5	0.2	2.1	10.8	28.5	—58.4—		0	4.6
Orissa										
4/1978–3/1979	Male	26.2	0.3	24.9	32.0	25.1	—17.7—		0	3.3
4/1978–3/1979	Female	78.9	0.5	15.3	29.9	30.3	—24.0—		0	3.6
Punjab										
4/1978–3/1979	Male	3.0	0	9.0	37.2	——53.8——			0	3.6
4/1978–3/1979	Female	16.7	0.1	7.0	32.9	——60.0——			0	3.7

Table E. Sterilization acceptor statistics, by number of living children: Selected countries and years *(continued)*

Country and acceptor period		Sample size (in 000s)	Percentage distribution by number of living children							Median number of living children
			0-1	2	3	4	5	≥6	Unknown	
Rajasthan										
4/1978–3/1979	Male	4.4	0.5	16.2	34.1	26.3	—22.9—		0	3.5
4/1978–3/1979	Female	16.5	0.6	7.0	32.2	30.1	—30.1—		0	3.8
Tamil Nadu										
11/1971–1/1972	Male[11]	93.2	2.9	24.1	31.9	21.6	11.9	7.6	0	3.2
4/1978–3/1979	Male	91.3	0.8	36.6	35.1	17.3	—10.2—		0	2.9
4/1978–3/1979	Female	125.1	0.5	27.3	36.5	19.5	—16.2—		0	3.1
Uttar Pradesh										
12/1972–1/1973	Male[12]	7.0	0	6.8	28.1	26.3	19.5	19.3	0	4.1
12/1972–2/1973	Male[13]	7.5	0	6.9	28.1	25.9	18.3	20.8	0	4.1
4/1978–3/1979	Male	3.8	0.2	11.1	31.8	31.9	—25.0—		0	3.7
4/1978–3/1979	Female	19.4	0.3	13.7	27.9	28.8	—29.3—		0	3.8
West Bengal										
4/1978–3/1979	Male	10.6	0.7	27.1	36.7	21.6	—13.9—		0	3.1
4/1978–3/1979	Female	56.9	1.1	20.2	38.9	23.5	—16.3—		0	3.2
Delhi										
4/1978–3/1979	Male	0.4	0.5	22.8	34.8	39.6	— 2.3—		0	3.3
4/1978–3/1979	Female	4.0	0.2	9.1	33.5	45.1	—12.1—		0	3.7
Other territories										
4/1978–3/1979	Male	1.0	1.0	21.8	32.8	26.7	—17.7—		0	3.3
4/1978–3/1979	Female	8.3	0.8	11.1	29.2	28.6	—30.3—		0	3.8
Ministry of Defense facilities										
4/1978–3/1979	Male	8.9	4.9	29.6	39.0	20.3	— 6.2—		0	2.9
4/1978–3/1979	Female	8.8	1.4	17.3	40.8	27.4	—13.1—		0	3.3
Ministry of Railways facilities										
4/1978–3/1979	Male	2.2	0.5	19.9	36.9	22.8	—19.9—		0	3.3
4/1978–3/1979	Female	5.4	0.2	8.8	31.7	29.8	—29.5—		0	3.8
Indonesia										
10–12/1977	Male	0.2	2.2	6.1	17.8	18.9	23.3	31.7	0	4.7
10–12/1977	Female	0.3	1.5	1.8	11.8	20.9	24.3	39.7	0	5.0
7–9/1978	Male	0.1	0	4.1	23.0	29.7	14.8	28.4	0	4.3
7–9/1978	Female	0.4	3.4	1.2	10.8	24.3	22.1	38.2	0	5.0
9–12/1980	Male	0.1	8.3	6.7	25.0	26.6	16.7	16.7	0	3.9
9–12/1980	Female	0.7	2.4	2.2	15.3	24.8	23.8	31.5	0	4.7
Korea, Republic of										
1968	Male	—	—	—	—	—	—	—	0	4.4
1969	Male	9.7	0.5	5.4	20.8	28.0	23.8	21.4	0	4.3
1970	Male	—	1.0	5.0	17.0	29.0	—48.0—		0	4.4
1971	Male	—	1.0	8.0	25.0	29.0	—36.0—		1.0	4.0
1972	Male	4.3	1.0	14.0	30.0	27.0	16.0	11.0	1.0	3.7
1972	Female	3.1	6.0	13.0	22.0	26.0	19.0	13.0	1.0	3.8
1973	Male	3.4	1.0	16.0	33.0	26.0	15.0	8.0	1.0	3.5
1973	Female	2.4	4.0	15.0	25.0	27.0	17.0	11.0	1.0	3.7
1974	Male	21.2	1.8	23.8	35.6	22.9	10.3	5.1	0.4	3.2
1974	Female	3.2	5.0	15.2	27.9	26.3	15.0	9.7	0.9	3.6
1975	Male	22.4	2.1	30.0	37.5	19.6	7.3	3.2	0.3	3.0

Table E. Sterilization acceptor statistics, by number of living children: Selected countries and years *(continued)*

Country and acceptor period		Sample size (in 000s)	Percentage distribution by number of living children							Median number of living children
			0-1	2	3	4	5	≥6	Unknown	
Korea, Republic of *(continued)*										
1975	Female	3.2	3.2	16.0	34.3	27.1	12.3	6.4	0.5	3.4
1976	Male	16.5	2.9	36.9	35.7	16.2	5.8	2.3	0.2	2.8
1976	Female	12.8	1.3	20.9	40.7	23.8	9.1	3.6	0.6	3.2
1977	Male	52.5	3.9	40.2	34.3	14.3	4.9	2.0	0.4	2.7
1977	Female	177.7	0.9	24.0	39.3	23.0	9.1	3.3	0.3	3.1
1978	Male	18.7	4.4	44.7	32.4	12.1	4.1	1.7	0.6	2.5
1978	Female	44.9	1.0	25.9	37.3	22.1	9.5	4.0	0.2	3.1
1979	Male	12.6	5.1	48.0	31.4	10.1	4.7	1.3	0.7	2.4
1979	Female	35.3	1.2	27.9	36.3	20.9	9.4	4.1	0.2	3.1
1980	Male	27.0	5.0	48.7	31.0	9.3	2.6	1.0	1.4	2.4
1980	Female	35.3	1.2	30.2	37.4	19.0	8.1	3.7	0.3	3.0
1981	Male	31.1	5.6	52.7	29.9	8.2	2.2	0.8	0.6	2.3
1981	Female	40.2	1.5	33.9	37.9	16.9	6.7	2.9	0.2	2.9
Malaysia										
1971	All	4.0	0.4	2.6	6.8	11.7	16.3	62.3	0	5.7
1972	All	3.9	0.5	3.1	7.2	13.5	17.5	58.2	0	5.6
1973	All	4.1	0.6	2.9	9.3	15.5	17.4	54.3	0	5.6
1974	All	4.1	0.3	3.0	9.2	17.6	18.7	51.2	0	5.5
1976	All	4.0	0.8	5.3	13.4	19.8	19.5	41.2	0	5.0
1977	All	3.6	0.7	4.6	14.2	22.0	18.1	40.4	0	5.0
1978	Female	4.6	0.7	5.6	16.7	21.8	20.4	34.8	0	4.8
1980	Male	0.2	1.0	15.4	25.1	26.7	16.4	15.4	0	3.8
1980	Female	4.9	1.1	6.9	17.9	24.3	19.3	30.5	0	4.5
Nepal										
7/1972–7/1973	Male	1.7	0	6	19	22	20	33	0	4.6
7/1973–7/1974	Male	1.8	0.2	7.5	18.4	23.9	19.7	30.0	0.3	4.5
1975–76	Male	1.3	0.2	5.3	21.7	24.2	19.8	28.8	0	4.4
1975–76	Female	0.6	0.9	3.4	20.5	25.9	25.2	24.1	0	4.5
New Zealand										
1981	Male	4.4	6	43	31	9	2	1	8	2.4
1981	Female	5.2	6	29	26	12	5	3	19	2.7
Pakistan										
1967–68	All	6.7	0.2	7.3	21.8	22.0	18.0	30.7	0	4.4
1976–77	Male	1.3	2.0	3.8	11.3	16.3	22.3	43.2	1.1	5.2
1976–77	Female	7.4	1.2	4.8	9.3	15.1	19.9	49.5	0.2	5.5
Philippines										
7–12/1975	Male	4.2	2.4	11.9	19.0	21.4	16.7	28.6	0	4.3
7–12/1975	Female	13.2	0.8	6.0	16.7	24.2	18.2	34.1	0	4.6
6–12/1977	All	29.1	—— 8.7 ——		—— 44.2 ——		29.2[14]	17.8[15]	0	4.5
1977	Male	0.5	11.5	11.5	20.2	19.7	14.6	22.5	0	3.8
1977	Female	4.5	1.7	7.6	21.0	23.0	16.7	30.0	0	4.4
1–8/1978	Male	3.9	—— 43.0 ——		—— 38.2 ——		18.6	0.2	0	2.9
1978	—	53.4	—— 10.3 ——		—— 44.9 ——		28.2[14]	16.6[15]	0	4.3
1979	—	49.4	—— 9.2 ——		—— 49.0 ——		27.4[14]	14.4[15]	0	4.2
1980	—	61.5	—— 9.1 ——		—— 51.3 ——		26.8[14]	12.8[15]	0	4.1
1980	Male	1.3	0.7	7.2	24.5	27.1	17.3	23.2	0	4.1
1980	Female	41.2	1.7	10.5	26.5	24.0	14.4	22.9	0	4.0
1981	—	65.5	—— 8.3 ——		—— 53.0 ——		27.2[14]	11.5[15]	0	4.1

Table E. Sterilization acceptor statistics, by number of living children: Selected countries and years *(continued)*

Country and acceptor period		Sample size (in 000s)	Percentage distribution by number of living children							Median number of living children
			0-1	2	3	4	5	≥6	Unknown	
Singapore										
1972	Female	5.8	2.0	14.0	24.0	19.0	13.0	27.0	1.0	4.0
1973	Female	8.7	3.0	16.0	28.0	20.0	12.0	21.0	0.0	3.6
1974	Female	9.2	4.0	20.0	28.0	20.0	11.0	17.0	0	3.4
1975	All	9.6	1.5	14.9	34.3	22.9	11.2	14.8	0.4	3.5
1976	Male	0.4	1.3	45.9	27.2	12.3	—12.0—		1.3	2.6
1976	Female	9.5	1.7	17.5	39.2	21.4	—19.8—		0.4	3.3
1977	Male	0.3	2.6	65.8	19.3	7.9	4.4	—	0	2.2
1977	Female	7.4	1.6	19.5	41.2	21.7	15.5	—	0.5	3.2
1978	Male	0.3	4.4	71.2	14.6	5.1	1.6	2.8	0.3	2.1
1978	Female	6.6	2.6	22.5	43.0	19.0	6.2	6.2	0.5	3.1
1980	Male	0.4	11.8	70.8	11.5	4.4	—1.5—		0	2.0
1980	Female	5.3	3.1	26.4	45.4	17.1	—7.9—		0	2.9
Sri Lanka										
1973	Female	20.2	0.5	3.7	14.4	19.7	18.8	38.1	4.8	5.0
1974	All	42.2	0.9	6.9	20.8	22.0	17.6	29.8	2.0	4.4
1-9/1975	Male	4.6	1.8	17.9	24.6	19.7	13.2	20.1	2.8	3.7
1-9/1975	Female	24.9	0.4	4.2	20.6	22.5	18.9	31.8	1.7	4.6
1975	Female	39.2	0.6	6.2	21.4	22.4	18.2	29.7	1.5	4.4
1980	Male	51.3	0.1	19.3	33.6	20.4	11.5	12.9	1.6	3.4
1980	Female	61.6	0.2	5.4	29.8	29.7	17.5	17.2	0.3	4.0
1981	Male	30.3	0.4	20.1	35.2	19.4	11.3	12.3	1.3	3.3
1981	Female	46.3	0.2	6.2	33.4	28.2	15.7	15.3	1.0	3.8
Taiwan									•	
1972	All	0.8	1.9	8.0	23.7	31.6	21.1	12.2	1.4	4.0
1976	All	40.6	0.8	10.8	37.0	31.0	12.9	6.7	0.8	3.5
1978	Male	3.9	0.0	28.9	42.1	21.0	5.3	2.6	0	3.0
1978	Female	46.2	0.9	11.3	40.3	30.5	11.0	5.6	0.4	3.4
1979	All	52.8	0.9	13.2	42.7	28.7	9.6	4.5	0.3	3.3
1979	Male	3.2	3.0	30.3	39.4	18.2	6.1	3.0	0	2.9
1979	Female	49.6	0.8	12.1	42.8	29.5	9.9	4.7	0.2	3.4
1981	All	51.1	0.9	16.0	44.6	26.6	8.3	3.4	0.2	3.2
Thailand										
1973	All	—	1.3	8.5	25.9	26.3	17.8	20.2	0	4.0
1974	All	1.1	0.9	11.4	31.4	23.8	13.2	19.3	0	3.8
1975	All	—	1.1	15.9	27.6	23.2	14.9	16.8	0.4	3.7
1976	Male	2.1	0.9	23.4	23.0	20.6	11.5	17.8	2.8	3.6
1976	Female	1.5	2.2	16.9	31.5	21.6	12.6	14.2	1.0	3.5
1977	Male	0.3	3.3	24.1	26.1	17.6	13.7	15.3	0	3.4
1977	Female	1.7	1.2	18.8	30.5	21.8	13.0	14.9	0	3.5
1978	Male	0.5	3.9	29.1	17.9	19.1	11.8	18.2	0	3.4
1978	Female	1.2	0.6	23.2	32.5	21.1	9.7	12.8	0	3.3

Table E. Sterilization acceptor statistics, by number of living children: Selected countries and years *(continued)*

Country and acceptor period		Sample size (in 000s)	Percentage distribution by number of living children							Median number of living children
			0-1	2	3	4	5	≥6	Unknown	
Tunisia										
1969	Female	1.9	0.4	2.0	4.1	12.8	21.9	53.0	5.8	5.6
1975	Female	6.3	1.6	2.1	5.2	16.0	24.6	45.1	5.4	5.4

Notes
1. Dhaka.
2. Government programs.
3. Cases from London, Ontario, only.
4. For IPPF affiliate (PROFAMILIA) only.
5. Camps in Vizag.
6. Camps in Monghyr and Musaffarpur.
7. Camps in all districts.
8. Camps in Gurgaon district.
9. Camps in Trivandrum.
10. Camps in Ernakulam.
11. Camps in seven districts.
12. Camps in Allahabad.
13. Camps in Meerut.
14. Five and six children.
15. Seven or more.

References
See references for Table D.

Table F. Percentage of couples protected by sterilization, by wife's current age: Selected countries and years

Combined totals for males and females (*All*) are included only if the source reported data in that fashion. For years in which separate male and female data are given, simply add the two lines to obtain the total percentage of couples protected.

Country and year		Wife's current age-group								Reference
		15–19	20–24	25–29	30–34	35–39	40–44	45–49	Total	
Bangladesh										
1975–76	Male	0.0	0.3	0.3	0.4	2.3	0.7	0.4	0.5	Carrasco, 1981
1975–76	Female	0.1	0.1	0.3	0.6	0.9	0.6	0.2	0.3	Carrasco, 1981
1979	Male	0.1	0.6	0.9	0.9	1.3	2.0	1.6	0.9	WHS, 1984
1979	Female	0.1	1.2	2.5	5.1	4.1	4.3	2.7	2.5	WHS, 1984
1981	All	0.5	2.5	6.0	8.5	8.9	7.5	4.1	—	Bangladesh, 1981a
Barbados										
1980–81	Female	0.0	3.4	11.5	21.1	31.5	14.5	24.2	11.6	Nair, 1982
Belgium										
1975–76	All	—— 0.5 ——		—— 2.2 ——		—— 4.6 ——		—	2.7	Klinger, 1981
Brazil[1]										
1978 (São Paulo)		0.9	2.7	9.5	20.8	27.8	20.8	—	16.1	Morris, 1984
1979 (Piauí)		0.0	2.7	11.8	24.2	22.7	20.7	—	15.4	Morris, 1984
1980 (Bahía)		0.0	1.2	7.3	12.9	16.7	16.3	—	9.6	Morris, 1984
1980 (Paraíba)		0.0	4.1	12.9	17.0	28.4	24.2	—	15.7	Morris, 1984
1980 (Pernambuco)		0.0	6.1	12.1	30.0	27.1	28.4	—	18.9	Morris, 1984
1980 (Rio Grande do Norte)		0.0	3.6	12.5	19.4	32.4	28.7	—	17.4	Morris, 1984
1981 (Rio Grande do Sul, Paraná, Santa Catarina)		0.0	3.2	9.5	22.0	27.0	20.1	—	14.6	Morris, 1984
1982 (Amazonas)[2,3]		0.4	10.5	29.3	42.6	62.5	40.7	—	33.1	Morris, 1984
1982 (Piauí)		0.2	6.9	16.9	27.5	31.1	27.1	—	19.6	Morris, 1984
China, People's Republic of										
1982	Male	—	0.3	3.8	8.6	11.2	11.3	9.3	7.3	China, 1983
1982	Female	—	1.6	10.6	26.0	32.1	25.8	14.1	18.5	China, 1983
Colombia										
1976	Male	0.0	0.2	0.3	0.2	0.0	0.3	0.0	0.2	Carrasco, 1981
1976	Female	0.0	0.8	2.2	6.6	8.2	6.2	2.9	4.0	Carrasco, 1981
1978	Female	0.0	0.8	3.4	9.5	13.9	15.3	7.8	7.4	WHS, 1984
1980	Female	0.0	1.1	6.3	15.0	21.4	20.0	7.6	10.5	WHS, 1984
Costa Rica										
1976	Male	—	0.0	1.4	2.0	0.7	0.6	1.0	1.0	Carrasco, 1981
1976	Female	—	0.6	6.8	13.1	23.0	20.3	15.3	12.3	Carrasco, 1981
1978	Female	0.0	1.0	6.1	18.1	25.3	29.6	24.5	14.0	WHS, 1984
1980–81	Female	0.0	2.0	6.0	18.9	36.6	37.8	28.0	17.3	WHS, 1984
Dominican Republic										
1975	Male	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.1	Carrasco, 1981
1975	Female	0.0	3.8	13.5	19.9	21.7	12.7	8.7	11.9	Carrasco, 1981
El Salvador										
1974	Female	0.0	2.0	11.0	15.8	10.7	5.9	6.4	6.3	Morris et al., 1979
1978	All	0.0	11.7	24.2	22.3	26.0	16.9	12.4	18.0	ADS, 1979
Fiji										
1974	Male	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.1	Carrasco, 1981
1974	Female	0.0	0.9	9.9	22.1	27.8	26.6	20.7	15.8	Carrasco, 1981

Table F. Percentage of couples protected by sterilization, by wife's current age: Selected countries and years *(continued)*

Combined totals for males and females (*All*) are included only if the source reported data in that fashion. For years in which separate male and female data are given, simply add the two lines to obtain the total percentage of couples protected.

Country and year		Wife's current age-group								Reference
		15–19	20–24	25–29	30–34	35–39	40–44	45–49	Total	
France										
1977	All	—— 0.9 ——		—— 2.8 ——		—— 7.5 ——		—	4.4[4]	Klinger, 1981
1977[5]	Female	—	0.6	1.3	6.1	15.8	16.8	—	7.3	France, 1981
Great Britain										
1975	All	—— 3.0 ——		—— 14.0 ——		—— 22.0 ——		7.0	14.0[4]	Klinger, 1981
Guatemala										
1983	All	0.5	2.6	9.5	17.9	20.2	17.9	—	11.2	APROFAM, forthcoming
Guyana										
1975	Male	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	Carrasco, 1981
1975	Female	0.0	0.3	3.0	12.9	17.0	19.8	14.5	8.5	Carrasco, 1981
Honduras										
1981	Female	0.0	1.2	5.2	13.8	13.7	13.2	10.4	8.0	WHS, 1984
Hungary										
1977	All	—— 0.4 ——		—— 1.1 ——		1.7	—	—	1.0[4]	Klinger, 1981
India										
1970	Male	—— 0.8 ——		2.5	5.0	6.4	5.1	—	3.6	ORG, 1972
1970	Female	—— 0.3 ——		2.6	4.1	3.9	3.6	—	2.7	ORG, 1972
1980	All	0.0	4.5	18.4	29.7	37.6	—— 33.6 ——		22.4	Khan, 1980
Indonesia										
1976	Male	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	Carrasco, 1981
1976	Female	0.0	0.0	0.1	0.3	0.7	0.4	0.3	0.3	Carrasco, 1981
Italy										
1978	Female	0.0	0.0	0.1	1.7	0.9	0.2	—	0.7	DeSandre et al., 1982
Jamaica										
1975–76	Male	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Carrasco, 1981
1975–76	Female	0.0	0.6	2.5	13.4	16.2	19.1	10.1	8.1	Carrasco, 1981
Jordan										
1976	Male	0.0	0.0	0.0	0.0	0.1	0.1	0.9	0.1	Carrasco, 1981
1976	Female	0.0	0.0	0.4	1.6	3.6	4.6	3.5	1.8	Carrasco, 1981
Korea, Republic of										
1971	Male	—	—	0.7	2.0	4.1	4.0	—	2.3	KIFP, 1978
1971	Female	—	—	0.4	1.0	2.0	1.4	—	1.0	KIFP, 1978
1973	All	—	—	2.0	5.0	8.0	6.0	—	5.0	KIFP, 1978
1974	Male	0.0	0.2	1.4	2.8	6.0	5.5	4.0	3.3	Carrasco, 1981
1974	Female	0.0	0.0	0.3	3.3	2.5	2.0	1.9	1.7	Carrasco, 1981
1976	Male	—	0.8	2.8	5.9	5.6	4.8	—	4.2	KIFP, 1978
1976	Female	—	0.2	1.6	5.5	7.4	4.2	—	4.1	KIFP, 1978
1979	Male	0.0	1.0	3.8	8.2	7.7	6.1	5.8	5.9	WHS, 1984
1979	Female	0.0	1.4	9.0	21.6	22.5	10.5	2.9	13.0	WHS, 1984
Malaysia										
1974	Male	0.0	0.0	0.2	0.2	0.7	0.8	0.7	0.4	Carrasco, 1981
1974	Female	0.0	0.3	1.2	4.9	6.1	5.7	3.5	3.4	Carrasco, 1981
Mexico										
1976–77	Male	0.0	0.0	0.1	0.3	0.7	0.2	0.0	0.2	Carrasco, 1981
1976–77	Female	0.2	0.5	1.3	3.6	5.0	5.3	3.4	2.7	Carrasco, 1981

Table F. Percentage of couples protected by sterilization, by wife's current age: Selected countries and years *(continued)*

Combined totals for males and females (*All*) are included only if the source reported data in that fashion. For years in which separate male and female data are given, simply add the two lines to obtain the total percentage of couples protected.

Country and year		Wife's current age-group								Reference
		15–19	20–24	25–29	30–34	35–39	40–44	45–49	Total	
Nepal										
1976	Male	0.0	0.3	1.6	3.2	3.3	2.1	1.7	1.6	Carrasco, 1981
1976	Female	0.0	0.1	0.0	0.0	0.4	0.0	0.0	0.1	Carrasco, 1981
1981	Male	0.0	0.7	2.2	4.3	5.7	4.8	4.4	2.9	WHS, 1984
1981	Female	0.2	0.9	2.1	4.3	2.8	3.5	3.2	2.3	WHS, 1984
Netherlands										
1975	All	——	0.5 ——	——	4.4 ——	——	8.6 ——		5.2	4.2[4] Klinger, 1981
Norway										
1977	All	——	0.2 ——	——	4.0 ——	——	11.9 ——		—	6.3[4] Klinger, 1981
Pakistan[6]										
1975	Male	0.0	0.0	0.0	0.1	0.2	0.2	0.0	0.1	Carrasco, 1981
1975	Female	0.0	0.0	0.4	0.7	2.0	1.7	3.0	0.9	Carrasco, 1981
Panama										
1976	Male	—	0.2	0.0	0.9	0.5	0.3	0.3	0.4	Carrasco, 1981
1976	Female	—	0.8	13.6	23.8	31.4	35.8	35.5	21.2	Carrasco, 1981
1979	Female	0.0	3.3	15.7	40.3	53.1	56.5	—	29.7	Monteith et al., 1981
Peru										
1977–78	Male	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Carrasco, 1981
1977–78	Female	0.0	0.2	1.3	4.2	6.3	2.9	2.9	2.8	Carrasco, 1981
1981	Female	0.1	0.4	1.8	5.5	8.7	8.1	5.9	4.5	WHS, 1984
Philippines										
1978	Male	0.0	0.3	0.6	0.9	1.1	0.5	0.4	0.7	Carrasco, 1981
1978	Female	0.0	1.4	4.5	6.3	7.2	5.3	2.7	4.7	Carrasco, 1981
Portugal										
1979–80	Female	——	0 ——	——	1 ——	——	1 ——		2	1 "Portugal . . . ," 1982
Puerto Rico										
1965[7]	Female	—	15.5	27.6	33.7	42.4	34.8	33.9	31.4	Presser, 1969
1974[7]	Female	—	5.7	17.3	30.1	42.1	32.7	47.5	29.7	Presser, 1980
1982[8]	All	0.0	12.1	35.8	52.2	62.5	60.9	53.0	45.6	Herold et al., 1984
Spain										
1977	All	——	——	0.3 ——	——	——	0.4 ——		——	0.3[4] Klinger, 1981
Sri Lanka										
1975	Male	0.0	0.2	0.7	1.3	1.0	0.9	0.0	0.7	Carrasco, 1981
1975	Female	0.5	1.7	7.7	13.1	14.5	11.6	6.2	9.2	Carrasco, 1981
Sweden										
1980	All	—	0.1	0.4	2.9	3.5	5.2	—	2.3	Sweden, 1984
Syria[9]										
1978	Male	0	0	0	0	0.2	0	0.4	0.1	Syria, 1982
1978	Female	0	0	0.1	0.1	0.8	0.5	0.8	0.3	Syria, 1982
Taiwan[10]										
1965	Female	—	0	3	6	9	—	—	—	Taiwan, 1983
1967		—	0	2	8	11	—	—	—	Taiwan, 1983
1970	Female	—	1	3	9	15	—	—	—	Taiwan, 1983
1973	Female	—	1	6	12	15	—	—	—	Taiwan, 1983
1976	Female	—	2	7	15	19	—	—	—	Taiwan, 1983
1980	Female	—	3	12	26	27	—	—	—	Taiwan, 1983

Table F. Percentage of couples protected by sterilization, by wife's current age: Selected countries and years *(continued)*

Combined totals for males and females (*All*) are included only if the source reported data in that fashion. For years in which separate male and female data are given, simply add the two lines to obtain the total percentage of couples protected.

Country and year		Wife's current age-group								Reference
		15–19	20–24	25–29	30–34	35–39	40–44	45–49	Total	
Thailand										
1975	Male	0.0	0.9	1.9	1.6	4.9	2.6	1.4	2.1	Carrasco, 1981
1975	Female	0.5	1.5	6.5	8.6	9.9	8.6	4.7	6.3	Carrasco, 1981
1978	Male	0.0	0.9	3.4	4.0	5.9	4.1	4.4	3.6	WHS, 1984
1978	Female	0.0	3.5	12.2	18.6	20.2	14.3	12.3	12.9	WHS, 1984
1981	Male	0.0	0.8	2.4	4.8	7.5	7.4	3.3	4.1	WHS, 1984
1981	Female	0.7	5.5	17.5	25.6	28.5	21.1	13.8	18.3	WHS, 1984
Turkey										
1978	Male	0.0	0.0	0.1	0.1	0.3	0.5	0.0	0.2	Hacettepe, 1980
1978	Female	0.0	0.0	0.0	0.9	0.3	1.3	0.4	0.4	Hacettepe, 1980
United States										
Currently married: Contraceptive sterilizations										
1965	All	—	1.7	—	8.4	—	10.4	—	7.8	Westoff, 1976
1965	Male	—	0.9	—	3.7	—	4.1	—	3.3	Westoff, 1976
1965	Female	—	0.8	—	4.7	—	6.3	—	4.5	Westoff, 1976
1970	All	—	1.4	—	10.4	—	17.2	—	10.6	Westoff, 1976
1970	Male	—	0.8	—	5.0	—	8.1	—	5.1	Westoff, 1976
1970	Female	—	0.6	—	5.4	—	9.1	—	5.5	Westoff, 1976
1973	All	—	4.0	—	16.4	—	24.3	—	16.4	Ford, 1978
1973	Male	—	1.5	—	8.1	—	11.4	—	7.8	Ford, 1978
1973	Female	—	2.5	—	8.2	—	12.9	—	8.6	Ford, 1978
1976	All	—	3.5	—	19.8	—	28.9	—	19.3	Ford, 1978
1976	Male	—	1.0	—	9.2	—	15.9	—	9.7	Ford, 1978
1976	Female	—	2.5	—	10.6	—	13.0	—	9.6	Ford, 1978
1982[11]	All	—	4.4	18.7	32.3	44.7	40.9	—	21.3	Forrest and Henshaw, 1983
1982[11]	Male	—	1.8	7.8	13.1	18.9	17.5	—	8.9	Forrest and Henshaw, 1983
1982[11]	Female	—	2.6	10.9	19.2	25.8	23.4	—	12.4	Forrest and Henshaw, 1983
1982[3]	All	—	7.5	15.5	32.3	39.6	45.5	—	27.9	Pratt, 1984
1982[3]	Male	—	3.6	5.2	12.5	14.2	17.5	—	10.4	Pratt, 1984
1982[3]	Female	—	3.9	10.3	19.8	25.5	28.0	—	17.4	Pratt, 1984
Currently married: Noncontraceptive sterilizations										
1973	All	—	0.1	—	3.5	—	14.4	—	6.5	Ford, 1978
1973	Male	—	0.0	—	0.3	—	0.3	—	0.2	Ford, 1978
1973	Female	—	0.1	—	3.2	—	14.0	—	6.3	Ford, 1978
1976	All	—	0.4	4.1	9.8	16.5	12.6	—	9.0	Ford, 1978
1976	All	—	0.4	—	6.3	—	18.0	—	9.0	Ford, 1978
1976	Male	—	0.0	—	0.8	—	1.2	—	0.8	Ford, 1978
1976	Female	—	0.4	—	5.5	—	16.8	—	8.2	Ford, 1978
1982	Female[12]	0.3	0.5	4.2	11.3	18.5	21.2	—	11.1	Pratt, 1984
All women[13]: Tubal sterilizations										
1971	Female	0.0	0.3	2.1	5.0	7.8	6.7	—	3.0	Nolan et al., 1982
1972	Female	0.0	0.4	2.8	5.8	8.2	7.5	—	3.4	Nolan et al., 1982
1973	Female	0.0	0.7	3.5	6.9	8.8	8.5	—	4.0	Nolan et al., 1982
1974	Female	0.1	1.0	4.4	8.3	9.9	9.6	—	4.7	Nolan et al., 1982
1975	Female	0.1	1.3	5.2	9.9	11.3	10.7	—	5.4	Nolan et al., 1982
1976	Female	0.1	1.4	6.1	11.7	13.0	11.9	—	6.2	Nolan et al., 1982
1977	Female	0.1	1.6	6.6	13.2	14.9	13.3	—	7.1	Nolan et al., 1982
1978	Female	0.0	1.9	7.6	14.7	17.1	14.8	—	8.1	Nolan et al., 1982

Table F. Percentage of couples protected by sterilization, by wife's current age: Selected countries and years *(continued)*

Combined totals for males and females (*All*) are included only if the source reported data in that fashion. For years in which separate male and female data are given, simply add the two lines to obtain the total percentage of couples protected.

Country and year		Wife's current age-group								Reference
		15–19	20–24	25–29	30–34	35–39	40–44	45–49	Total	
All women[13]: Hysterectomies										
1971	Female	0.0	0.1	1.1	3.6	7.9	13.0	—	3.6	Nolan et al., 1982
1972	Female	0.0	0.1	1.3	4.1	8.6	13.6	—	3.8	Nolan et al., 1982
1973	Female	0.0	0.2	1.6	4.7	9.6	14.3	—	4.1	Nolan et al., 1982
1974	Female	0.0	0.3	1.9	5.3	10.4	15.3	—	4.4	Nolan et al., 1982
1975	Female	0.0	0.3	2.0	5.8	11.1	16.5	—	4.7	Nolan et al., 1982
1976	Female	0.0	0.3	2.2	6.4	11.9	17.5	—	5.0	Nolan et al., 1982
1977	Female	0.0	0.3	2.2	6.7	12.4	18.3	—	5.2	Nolan et al., 1982
1978	Female	0.0	0.4	2.3	6.9	13.0	19.2	—	5.5	Nolan et al., 1982

Notes

1. Females, married.
2. Urban only.
3. Preliminary data.
4. The figures for total prevalence are generally below the figures in Table B for prevalence, but we have retained these totals, which are given in Klinger's original paper based on WFS data.
5. All women.
6. Probably underreported. The Pakistan WFS did not probe on knowledge of contraceptive methods, and it asked about use only for those methods spontaneously mentioned as known (see Carrasco, 1981, p. 10).
7. Ever-married women.
8. Data are preliminary and unweighted.
9. Ever-married women. Currently married, fecund women show slightly higher prevalence in over-30 category.
10. The 20–24 age category includes only those aged 22–24.
11. Calculated from Tables 2 and 4 of Forrest and Henshaw, 1983.
12. Includes a very small number of males.
13. All women 15–44 regardless of marital status.

Table G. Percentage of couples protected by sterilization, by number of living children: Selected countries and years

Combined totals for males and females (*All*) are included only if the source reported data in that fashion. For years in which separate male and female data are given, simply add the two lines to obtain the total percentage of couples protected.

Country and year		Number of living children							Reference
		0	1	2	3	4	≥5	Total	
Bangladesh									
1975–76	Male	0.2	0.1	0.3	0.5	0.8	0.9	0.5	Carrasco, 1981
1975–76	Female	0.2	0.0	0.0	0.3	0.5	0.6	0.3	Carrasco, 1981
1979	Male	0.5	0.2	0.8	1.2	1.4	1.2	0.9	WHS, 1984
1979	Female	0.0	0.3	1.5	2.4	4.3	4.9	2.5	WHS, 1984
1981	All	0.1	0.8	4.0	6.2	8.8	—[1]	—[1]	Bangladesh, 1981a
Barbados									
1981	Female	0.4	1.2	9.8	25.1	35.8	43.3	14.4	WHS, 1984
Belgium									
1975–76	All	0.4	0.9	1.8	1.1	6.1	13.9	2.7	Klinger, 1981
Brazil									
1980 (Bahía)	Female	0.0	0.3	7.4	14.3	16.3	14.3	9.6	Morris, 1984
1980 (Paraíba)	Female	1.3	5.5	10.3	22.6	20.7	24.7	15.7	Morris, 1984
1980 (Pernambuco)	Female	0.9	4.9	16.4	30.3	34.2	24.8	18.9	Morris, 1984
1980 (Rio Grande do Norte)	Female	0.0	2.3	16.7	26.6	31.2	24.4	17.4	Morris, 1984
1981 (Rio Grande do Sul, Paraná, Santa Catarina)	Female	0.3	1.9	10.0	31.4	24.1	27.0	14.6	Morris, 1984
1982 (Piauí)	Female	0.0	4.3	14.4	28.9	27.0	29.7	19.6	Morris, 1984
Colombia									
1976	Male	0.0	0.0	0.0	0.2	0.3	0.3	0.2	Carrasco, 1981
1976	Female	0.8	0.0	1.4	5.3	5.2	6.8	4.0	Carrasco, 1981
1978	Female	1.6	0.0	3.1	9.4	9.1	13.3	7.4	WHS, 1984
1980	Female	0.0	1.1	6.3	15.0	21.4	20.0	7.6	WHS, 1984
Costa Rica[2]									
1976	Male	0.0	0.7	0.6	1.7	1.1	1.1	1.0	Carrasco, 1981
1976	Female	1.6	1.4	3.7	13.8	18.2	22.2	12.3	Carrasco, 1981
1978	Female	0.6	1.5	6.2	23.0	20.0	26.5	14.0	WHS, 1984
1980	Female	2.6	1.0	7.2	23.1	29.9	35.4	17.3	WHS, 1984
Dominican Republic									
1975	Male	0.0	0.0	0.0	0.0	0.0	0.2	0.1	Carrasco, 1981
1975	Female	0.9	0.8	8.1	17.5	19.7	17.6	11.9	Carrasco, 1981
Fiji									
1974	Male	0.0	0.0	0.1	0.3	0.0	0.0	0.1	Carrasco, 1981
1974	Female	0.4	0.5	3.4	8.0	22.7	34.3	15.8	Carrasco, 1981
France									
1977	All	0.0	0.4	2.8	9.2	11.0	16.2	4.4	Klinger, 1981
Great Britain									
1975	All	0.1	0.5	14.0	24.0	36.0	37.0	14.0	Klinger, 1981
Guyana									
1975	Male	0.0	0.0	0.2	0.0	0.0	0.0	0.0	Carrasco, 1981
1975	Female	0.5	0.4	1.8	5.6	7.1	19.2	8.5	Carrasco, 1981
Honduras									
1981	Female	0.0	1.2	2.7	7.3	12.4	12.9	8.0	WHS, 1984
Hungary									
1977	All	— 0.4 —		1.7	0.9	— 3.7 —		1.0	Klinger, 1981

Table G. Percentage of couples protected by sterilization, by number of living children: Selected countries and years *(continued)*

Combined totals for males and females (*All*) are included only if the source reported data in that fashion. For years in which separate male and female data are given, simply add the two lines to obtain the total percentage of couples protected.

Country and year		Number of living children							Reference
		0	1	2	3	4	≥5	Total	
India									
1970	Male	0.3	0.5	2.2	4.9	6.3	7.1	3.6	ORG, 1972
1970	Female	—	0.3	1.6	2.3	4.7	6.8	2.7	ORG, 1972
1980	All	0.4	3.3	16.4	33.7	40.1	38.4	22.4	Khan, 1980
Indonesia									
1976	Male	0.0	0.0	0.0	0.0	0.0	0.1	0.1	Carrasco, 1981
1976	Female	0.0	0.0	0.1	0.1	0.4	0.8	0.3	Carrasco, 1981
Italy									
1978	Female	0.0	0.2	0.9	———	1.2	———	0.7	DeSandre et al., 1982
Jamaica									
1975–76	Female	0.7	1.7	1.9	4.7	8.7	20.3	8.1	Carrasco, 1981
Jordan									
1976	Male	0.0	0.0	0.0	0.1	0.0	0.2	0.1	Carrasco, 1981
1976	Female	0.5	0.0	0.4	0.6	0.5	3.1	1.8	Carrasco, 1981
Korea, Republic of									
1974	Male	0.0	0.3	2.4	4.6	5.3	4.1	3.3	Carrasco, 1981
1974	Female	0.0	0.1	2.4	2.5	2.2	1.7	1.7	Carrasco, 1981
1979	Male	0.5	1.1	7.4	8.6	7.6	4.2	5.9	WHS, 1984
1979	Female	0.5	2.4	14.8	21.1	16.9	8.9	13.0	WHS, 1984
Malaysia									
1974	Male	0.0	0.1	0.1	0.3	0.3	0.7	0.4	Carrasco, 1981
1974	Female	0.0	0.4	1.0	1.6	4.4	6.7	3.4	Carrasco, 1981
Mexico									
1976–77	Male	0.2	0.1	0.4	0.1	0.1	0.2	0.2	Carrasco, 1981
1976–77	Female	0.4	0.6	1.4	2.6	2.7	4.5	2.7	Carrasco, 1981
Nepal									
1976	Male	0.1	0.3	1.0	1.8	3.0	4.5	1.6	Carrasco, 1981
1976	Female	0.0	0.0	0.1	0.1	0.0	0.2	0.1	Carrasco, 1981
1981[3]	Male	0.0	0.5	1.4	4.4	7.4	5.6	2.9	WHS, 1984
1981[3]	Female	0.0	0.0	0.6	2.6	6.0	6.6	2.4	WHS, 1984
Netherlands									
1975	All	—	—	—	13.1	12.1	—	4.2	Klinger, 1981
Norway									
1977	All	0.3	0.6	4.8	12.1	15.0	27.5	6.3	Klinger, 1981
Pakistan[4]									
1975	Male	0.0	0.0	0.0	0.0	0.0	0.2	0.1	Carrasco, 1981
1975	Female	0.1	0.1	0.6	0.8	0.9	1.9	0.9	Carrasco, 1981
Panama									
1976	Male	0.0	0.0	0.6	0.4	0.3	0.4	0.4	Carrasco, 1981
1976	Female	1.7	3.0	10.5	25.6	28.8	31.8	21.2	Carrasco, 1981
1979	All	0.6	4.9	19.2	42.0	41.5	54.4 (45.9)[5]	29.7	Morris, 1984
Peru									
1977–78	Female	0.0	0.2	0.9	4.4	3.2	4.3	2.8	Carrasco, 1981
1981	Female	0.4	0.7	1.7	4.6	8.4	7.3	4.5	WHS, 1984

Table G. Percentage of couples protected by sterilization, by number of living children: Selected countries and years *(continued)*

Combined totals for males and females (*All*) are included only if the source reported data in that fashion. For years in which separate male and female data are given, simply add the two lines to obtain the total percentage of couples protected.

Country and year		Number of living children							Reference
		0	1	2	3	4	≥5	Total	
Philippines									
1978	Male	0.0	0.4	0.3	0.6	1.1	0.8	0.7	Carrasco, 1981
1978	Female	0.4	0.8	3.0	6.8	7.3	5.3	4.7	Carrasco, 1981
Portugal									
1979–80	Female	0[1]			2	3	4	1	"Portugal . . . ," 1982
Puerto Rico									
1965[6]	Female	5.4	30.3		46.2		32.6 (18.2)[7]	31.4	Presser, 1980
1974[6]	Female	6.9	18.3		44.4		41.7 (—)[8]	29.7	Presser, 1980
Spain									
1977	All	0.4	0.5	0.2	0.3	0.2	0.3	0.3	Klinger, 1981
Sri Lanka									
1975	Male	0.0	0.1	0.6	1.0	1.5	0.8	0.7	Carrasco, 1981
1975	Female	0.0	0.4	2.3	9.3	14.0	17.4	9.2	Carrasco, 1981
Syria[9]									
1978	Male	0.1				0		0.1	Syria, 1982
1978	Female	0.2				0.4		0.3	Syria, 1982
Thailand									
1975	Male	0.8	0.2	2.3	4.8	4.7	1.0	2.1	Carrasco, 1981
1975	Female	0.0	0.6	3.8	8.6	12.2	8.9	6.3	Carrasco, 1981
1978	Male	0.0	0.8	4.3	8.2	3.5	3.0	3.8	WHS, 1984
1978	Female	—	1.3	10.4	20.0	24.1	16.3	14.0	WHS, 1984
1981	Male	1.0	1.3	3.2	6.7	6.9	4.9	4.1	WHS, 1984
1981	Female	0.4	1.6	19.1	29.2	30.7	22.9	18.3	WHS, 1984
Turkey									
1978	Male	0.1				0.2		0.2	Hacettepe, 1980
1978	Female	0.4				0.5		0.4	Hacettepe, 1980
United States									
Contraceptive sterilizations[10]									
1970	All	0.8	1.7	7.6	15.5	21.3	24.0	10.6	Rochat, 1976
1970	Male	0.7	0.9	4.8	8.9	10.4	5.8	5.1	Rochat, 1976
1970	Female	0.1	0.8	2.8	6.6	10.9	18.2	5.5	Rochat, 1976
1982	All[11]	4.6	11.1	35.1		46.5		27.9	Pratt, 1984
1982	Male[11]	3.9	6.8	15.2		11.8		10.4	Pratt, 1984
1982	Female[11]	0.7	4.3	19.9		34.7		17.4	Pratt, 1984
All sterilizations									
1970	All[10]	5.1	6.3	13.9	22.3	29.8	32.6	—	Rochat, 1976
1982	All[11]	9.9	17.7	46.9		63.5		38.9	Pratt, 1984

Notes

1. This line continues as follows: five children—9.1; six children—8.9; seven children—6.8; eight children—3.3; nine or more children—3.8.
2. Data for various years are not strictly comparable.
3. Calculated from CPS data provided by Westinghouse Health Systems.
4. Women aged 20–49.
5. The proportions are 54.4% for five and 45.9% for six or more.
6. Ever-married women 20–49.
7. For 1965, 32.6% for those with 5–7, and 18.2% for those with eight or more.
8. For 1974, 41.7% for those with 5–7; percentage not computed for eight or more in 1974 because of small base.
9. Ever-married women, ever-use. For currently married, fecund women, the statistics are slightly higher.
10. By parity (including any current pregnancies), not number of living children.
11. Preliminary data.

Table H. Percentage of couples protected by sterilization, by wife's level of education: Selected countries and years

Combined totals for males and females (*All*) are included only if the source reported data in that fashion. For years in which separate male and female data are given, simply add the two lines to obtain the total percentage of couples protected.

Country and year		Wife's level of education							Reference
		None	Lower primary	Upper primary	Secondary	High school	College	Total	
Bangladesh									
1975–76	All	0.6	0.9			1.5		0.7	Klinger, 1981
1979	Male	1.1	0.7	0.6	0.4		0.1	0.9	Bangladesh, 1981b
1979	Female	1.7	2.5	3.4	2.5		3.8	2.3	Bangladesh, 1981b
1979	Male	1.1	0.4	0.3	0.0	—	—	0.9	WHS, 1984
1979	Female	2.1	3.6	4.3		1.8		2.5	WHS, 1984
Barbados									
1981	Female	0.0	28.7	21.3		9.8		14.1	WHS, 1984
Brazil									
1978 (São Paulo)	Female	18.6		14.3		14.9		16.1	Morris, 1984
1979 (Piauí)	Female	8.7	16.5	26.6		23.4		15.4	Morris, 1984
1980 (Bahía)	Female	4.8	10.4	12.8		17.9		9.6	Morris, 1984
1980 (Paraíba)	Female	11.0	12.4	17.9		20.3		14.3	Morris, 1984
1980 (Pernambuco)	Female	10.8	15.5	27.5		27.7		18.9	Morris, 1984
1980 (Rio Grande do Norte)	Female	13.6	16.4	19.1		21.6		17.4	Morris, 1984
1981 (S. Region)	Female	17.2	14.6	14.5		14.0		14.6	Morris, 1984
1982 (Amazonas)[1,2]	Female	15.3	28.3	34.6		36.4		33.1	Morris, 1984
1982 (Piauí)	Female	11.8	18.9	24.7		29.6		19.6	Morris, 1984
Colombia									
1976	All	2.6	3.5		5.1		4.2	3.6	Klinger, 1981
1978	Female	4.0	7.6	9.6		6.8		7.4	WHS, 1984
1980	Female	9.2	10.0	12.8		9.2		10.5	WHS, 1984
Costa Rica									
1976	All	16.3	12.4		10.6		5.6	11.7	Klinger, 1981
1978	Female	15.9	16.5	15.5		9.6		14.1	WHS, 1984
1980	Female	22.0	23.2	16.7		13.5		17.3	WHS, 1984
Dominican Republic									
1975	All	8.7	9.8		12.2		10.3	9.9	Klinger, 1981
El Salvador									
1978	All	14.4	20.2			20.5		18.0	ADS, 1979
Fiji									
1974	All	25.7	13.7			5.1		14.9	Klinger, 1981
Guatemala									
1983	All	6.5			15.1			11.2	APROFAM, forthcoming
Guyana									
1975	All	—	17.6			3.8		12.6	Klinger, 1981
Honduras									
1981	Female	5.0	6.6	10.7		12.6		8.0	WHS, 1984
India									
1970	Male	3.1	5.1		5.7		4.5	3.6	ORG, 1972
1970	Female	2.0	4.4		6.5		4.4	2.7	ORG, 1972
Indonesia									
1976	All	0.1	0.2			1.6		0.2	Klinger, 1981
Jamaica									
1975–76	All	—	14.8			4.8		12.5	Klinger, 1981

Table H. Percentage of couples protected by sterilization, by wife's level of education: Selected countries and years *(continued)*

Combined totals for males and females (*All*) are included only if the source reported data in that fashion. For years in which separate male and female data are given, simply add the two lines to obtain the total percentage of couples protected.

Country and year		Wife's level of education						Reference
		None	Lower primary	Upper primary	Second-ary	High school	College	Total	
Korea, Republic of									
1971	Male	2.1	—	2.1	2.8	3.2	2.2	—	KIFP, 1978
1971	Female	0.9	—	0.8	1.?	2.1	2.2	—	KIFP, 1978
1973	All	3.0	—	4.0	5.0	7.0	8.0	—	KIFP, 1978
1974	All	4.1	—	3.5	6.3	—	13.9	4.7	Klinger, 1981
1976	Male	3.8	—	3.4	4.9	6.6	3.5	—	KIFP, 1978
1976	Female	1.4	—	2.9	4.3	8.3	11.0	—	KIFP, 1978
1979	Male	4.2	3.6	4.8		7.8		5.9	WHS, 1984
1979	Female	8.0	12.4	13.3		14.4		13.0	WHS, 1984
Malaysia									
1974	All	3.0	—	3.6	4.4	—	2.9	3.5	Klinger, 1981
Mexico									
1976–77	All	1.4	—	2.6	4.1	—	2.5	2.6	Klinger, 1981
Nepal									
1976	All	1.4	—	2.5		22.2		1.5	Klinger, 1981
1981	Male	2.6	6.6	3.9		9.5		2.9	WHS, 1984
1981	Female	1.9	4.3	9.6		11.1		2.4	WHS, 1984
Pakistan									
1975	All	1	—	3		4		1	Klinger, 1981
Panama									
1976	All	12.6	—	20.8	17.3	—	12.3	18.3	Klinger, 1981
1979	All		33.4			24.1		29.7	Monteith et al., 1981
Peru									
1977–78	All	1.1	—	2.3	4.3	—	—	2.5	Klinger, 1981
1981	Female	2.8	4.2	6.5	4.4	—	—	4.5	WHS, 1984
Philippines									
1978	All	2.3	—	3.8	6.9	—	9.8	5.1	Klinger, 1981
Sri Lanka									
1975	All	7.1	—	9.0	9.8	—	9.0	8.9	Klinger, 1981
Thailand									
1975	All	5.3	—	7.6	12.9	—	10.0	7.6	Klinger, 1981
1978	Male	3.7	2.9	3.8		2.5		3.6	WHS, 1984
1978	Female	15.0	12.7	11.9		22.4		12.9	WHS, 1984
1981	Male	5.0	3.7	4.0		4.3		4.1	WHS, 1984
1981	Female	18.2	17.6	18.1		21.0		18.3	WHS, 1984
United States									
Contraceptive sterilizations									
1965	All			9.8		6.8	6.8	—	Mosher and Westoff, 1982
1970[3]	All			16.7		10.4	9.3	10.6	Rochat, 1976
1970[3]	Male			2.7		5.2	5.4	5.1	Rochat, 1976
1970[3]	Female			14.0		5.2	3.9	5.5	Rochat, 1976
1973	All			20.3		15.8	13.3	—	Mosher and Westoff, 1982
1976	All			21.1		19.0	15.4	—	Mosher and Westoff, 1982
All sterilizations									
1973[3]	All			27.6		17.4	13.7	17.0	Rochat, 1976

Notes

1. Preliminary data. 2. Urban areas only. 3. Currently married women less than age 45 years.

Table I. Percentage of couples protected by sterilization, by residence: Selected countries and years

Combined totals for males and females (*All*) are included only if the source reported data in that fashion. For years in which separate male and female data are given, simply add the two lines to obtain the total percentage of couples protected.

Country and year		Place of residence				Reference
		Capital city	Other urban	Rural	Total	
Bangladesh						
1975–76	All		2.4	0.6	0.7	Klinger, 1981
1979	Male		0.5	0.9	0.9	Bangladesh, 1981b
1979	Female		4.4	2.0	2.3	Bangladesh, 1981b
1981	All		6.4	4.6	4.8	Bangladesh, 1981a
Brazil						
1978 (São Paulo)	Female	13.9	18.0	14.1	16.1	Morris, 1984
1979 (Piauí)	Female	28.2		13.5	15.4	Morris, 1984
1980 (Bahía)	Female	11.4	13.0	6.1	9.6	Morris, 1984
1980 (Paraíba)	Female		19.4	8.7	15.7	Morris, 1984
1980 (Pernambuco)	Female	29.3[1]		12.6	18.9	Morris, 1984
1980 (Rio Grande do Norte)	Female		23.6	8.3	17.4	Morris, 1984
1981 (S. Region)	Female		15.9	12.1	14.6	Morris, 1984
1982 (Amazonas)[2]	Female	35.6	21.9	—	33.1	Morris, 1984
1982 (Piauí)	Female	34.2	24.3	13.0	19.6	Morris, 1984
China, People's Republic of						
1979–80 (Greater Shanghai)	Female		28.0	35.0	32.0	Tien, 1982
Colombia						
1969	Female		2	1	—	Colombia, 1983
1976	Female		7	4	—	Colombia, 1983
1978	Female		8.6	5.2	7.4	WHS, 1984
1980	Female		10.8	9.7	10.5	WHS, 1984
Costa Rica						
1964	Female		5.6	—	—	Rosero et al., 1980
1969	Male	—	—	0.2	—	Rosero et al., 1980
1969	Female	—	—	4.8	—	Rosero et al., 1980
1976	All		11.0	12.5	11.7	WHS, 1984
1976	Male		1.5	0.6	—	Rosero et al., 1980
1976	Female		15.9	15.8	—	Klinger, 1981
1978	Female		14.7	13.4	14.0	WHS, 1984
1980	Female		19.2	15.3	17.3	Rosero et al., 1980
Dominican Republic						
1975	All		12.5	7.3	9.9	Klinger, 1981
Ecuador						
1982	Male		0.0	0.1	0.0	Ecuador, 1982
1982	Female		16.3	8.5	12.4	Ecuador, 1982
El Salvador						
1975	Female	15.3	10.5	5.9	8.6	Morris et al., 1979
1978	All	28.0[1]	20.1	14.7	18.0	Morris et al., 1979
Fiji						
1974	All		16.7	14.0	14.9	Klinger, 1981
Ghana						
1979	All		0.4	0.6	—	UNDIESA, 1984

Table I. Percentage of couples protected by sterilization, by residence: Selected countries and years *(continued)*

Combined totals for males and females (*All*) are included only if the source reported data in that fashion. For years in which separate male and female data are given, simply add the two lines to obtain the total percentage of couples protected.

Country and year		Place of residence				Reference
		Capital city	Other urban	Rural	Total	
Guatemala						
1983	All	17.9[1]	14.7[3]	2.0[4]	11.2	Morris, 1984
Guyana						
1975	All	——	9.5 ——	14.3	12.6	Klinger, 1981
Honduras						
1981	Female	——	13.1 ——	5.4	8.0	Suazo et al., 1982
India						
1970	Male	——	4.4 ——	3.4	3.6	ORG, 1972
1970	Female	——	5.8 ——	2.0	2.7	ORG, 1972
Indonesia						
1976	All	——	0.9 ——	0.1	0.2	Klinger, 1981
Jamaica						
1975–76	All	——	10.2 ——	14.7	12.5	Klinger, 1981
Kenya						
1977–78	All	——	0.9 ——	0.9	—	UNDIESA, 1984
Korea, Republic of						
1971	Male	——	2.7 ——	2.0	—	KIFP, 1978
1971	Female	——	1.5 ——	0.7	—	KIFP, 1978
1973	All	——	6.7 ——	2.8	—	KIFP, 1978
1974	All	——	6.1 ——	3.2	4.7	Klinger, 1981
1976	Male	——	5.1 ——	3.2	4.2	KIFP, 1978
1976	Female	——	5.6 ——	2.4	4.1	KIFP, 1978
1978	Male	——	6.7 ——	4.1	5.6	Koh et al., 1980
1978	Female	——	13.8 ——	7.2	10.9	Koh et al., 1980
1979	Male	——	7.1 ——	4.0	5.9	Koh et al., 1980
1979	Female	——	16.2 ——	12.0	14.5	Koh et al., 1980
Lesotho						
1977	All	——	1.7 ——	0.7	—	UNDIESA, 1984
Malaysia						
1974	All	——	6.5 ——	2.9	3.5	Klinger, 1981
Mexico						
1976–77	All	——	4.4 ——	0.9	2.6	Klinger, 1981
Nepal						
1981[5]	Male	——	8.6 ——	2.5	2.9	Nepal, 1983a
1981[5]	Female	——	8.6 ——	2.0	2.4	Nepal, 1983a
Pakistan						
1975	All	——	2 ——	0	1.0	Klinger, 1981
Panama						
1976	All	——	19.0 ——	17.4	18.3	Klinger, 1981
1979	All	——	29.0 ——	30.3	29.7	Monteith et al., 1981
Paraguay						
1977	All	——	3.8 ——	2.6	2.9	Morris et al., 1978
Peru						
1977–78	All	——	3.6 ——	0.6	2.5	Klinger, 1981
1981	Female	——	5.7 ——	2.0	4.5	WHS, 1984

Table I. Percentage of couples protected by sterilization, by residence: Selected countries and years *(continued)*

Combined totals for males and females (*All*) are included only if the source reported data in that fashion. For years in which separate male and female data are given, simply add the two lines to obtain the total percentage of couples protected.

Country and year		Place of residence				Reference
		Capital city	Other urban	Rural	Total	
Philippines						
1978	All	—— 8.2 ——		3.6	5.1	Klinger, 1981
Senegal						
1977	All	—— 0.1 ——		0	—	UNDIESA, 1984
Sri Lanka						
1975	All	—— 12.0 ——		8.1	8.9	Klinger, 1981
Sudan						
1978–79	All	—— 0.3 ——		0.5	—	UNDIESA, 1984
Sweden						
1981	All	—— 0.3 ——		0.5	—	UNDIESA, 1984
Thailand						
1975	All	—— 13.0 ——		6.6	7.6	Klinger, 1981
1978	Male	—— 3.9 ——		3.5	3.6	WHS, 1984
1978	Female	—— 26.3 ——		10.1	12.9	WHS, 1984
1981	Male	—— 4.1 ——		4.1	4.1	WHS, 1984
1981	Female	—— 26.7 ——		16.6	18.3	WHS, 1984
United States[2]						
Contraceptive sterilizations						
1982[6]	All	—— 24.1 ——		29.1	27.9	Pratt, 1984
1982[6]	Male	—— 9.8 ——		10.6	10.4	Pratt, 1984
1982[6]	Female	—— 14.3 ——		18.4	17.4	Pratt, 1984
Noncontraceptive sterilizations						
1982[6]	Female[7]	—— 10.7 ——		11.2	11.1	Pratt, 1984

Notes
1. Metropolitan area.
2. Preliminary data.
3. Ladino.
4. Indian.
5. Calculated from CPS data provided by Westinghouse Health Systems.
6. Currently married couples, 15–44 years.
7. Includes a small number of males.

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